MASS. EA27.2: V88

MASSACHUSETTS 1990 BASE YEAR EMISSION INVENTORIES

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VOLATILE ORGANIC COMPOUND
NITROGEN OXIDES
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DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL

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NOVEMBER 1993

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MASSACHUSETTS 1990 BASE YEAR EMISSION INVENTORIES

VOLATILE ORGANIC COMPOUNDS

NITROGEN OXIDES

CARBON MONOXIDE

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SECTION I

OVERVIEW OF EMISSION INVENTORIES

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I. OVERVIEW OF EMISSION INVENTORIES

I-1 INTRODUCTION

In November 1990, the Clean Air Act Amendments (CAAA) were passed by Congress and signed into law by the President. Title I of the CAAA requires development of emission inventories for designated areas that failed to meet the National Ambient Air Quality Standards (NAAQS) for Ozone and Carbon Monoxide (CO). These inventories are to be prepared as a part of the State's revision to its State Implementation Plan (SIP) to formulate a strategy to attain the NAAQS for Ozone and CO.

The Massachusetts Department of Environmental Protection, Division of Air Quality Control (DEP-DAQC) is the agency responsible for developing the required draft emissions inventory submitted May 1, 1992. This November 1993 Emissions Inventory for Base Year 1990 incorporates revisions arising from comments on the July 1993 Public Hearings on the Draft version.

The DEP-DAQC has followed as closely as feasible, the four core EPA procedural guidance documents for the development of this draft emissions inventory. These documents include:

1. "Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume 1: General Guidance for Stationary Sources", known as the

"Procedures Document" or "Volume 1", (EPA 450/4-91-016).

2. "Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources," (EPA-450/4-91-026), together with the revised "Interim Guidance", February 1992.
3. Emission Inventory Requirements for Ozone State Implementation Plans" (EPA-4504-91-010) known as the "Ozone Requirements Document".
4. "Emission Inventory Requirements for Carbon Monoxide State Implementation Plans" (EPA-450/4-91-011), known as the "CO Requirements Document".

Massachusetts is in non-attainment of the Ozone (O_3) and Carbon Monoxide (CO) Standards and is required by Title I of the 1990 Clean Air Act Amendments (CAAA) to prepare a revision to the State Implementation Plan (SIP) by developing strategies and programs to attain these Standards. The initial requirements of the CAAA and the SIP revision is to develop a 1990 base year emissions inventory for precursors of these pollutants. For the Ozone SIP, emission inventories are required for a typical summer day for the three precursors of Ozone: Volatile Organic Compounds (VOC), Nitrogen Oxides (NOx) and Carbon Monoxide (CO). For the CO SIP, an emissions inventory is required for a typical winter day for CO. In Massachusetts, exceedances of the federal ozone standard occur during the summer whereas elevated CO levels occur during the winter.

I-2 INVENTORY PREPARATION PLAN AND QUALITY ASSURANCE

As part of the emissions inventory effort, an Inventory Preparation Plan (IPP) was submitted to EPA in February 1992. The IPP specified how the inventories are to be developed, documented and presented for Massachusetts. The IPP included a Quality Assurance (QA) Plan which an EPA Level of Effort (LOE) contractor implemented for the Draft Inventory. The QA process ensures that Massachusetts Department of Environmental Protection, Division of Air Quality Control (DEP/DAQC) utilized approaches to develop the most accurate emission estimates that are of the highest quality and are consistent with EPA's CAAA requirements and emission guidance documents. The results of the QA review are presented in Appendix F.

The LOE Contractor QA review comments were incorporated into this inventory. The definition of VOC was revised and is presented in Section A covering the Stationary Point Sources. Emissions from Asphalt Roofing Kettles and Tankers are included in this report in Section B under Stationary Area Sources, Solvent Section. The input of the emissions into the EPA National Aerometric Information Retrieval System, Area and Mobile Subsystem (AIRS-AMS) serves as another level of QA/QC.

EPA's review comments on the 1st and 2nd Inventory submittals provided further quality assurance. EPA's comments were followed as closely as feasible and incorporated into this inventory submittal. Comments from EPA Office of Mobile Sources on the Mobile Section of the May 1992 Draft Inventory were finally received in

August 1993 as part of EPA's public hearing comments.

I-3 NON-ATTAINMENT STATUS

Some inventory requirements are based on the non-attainment classification of the area of study. In early 1991, the U.S. EPA recommended designation classification of "serious" for ozone non-attainment for the Western and Eastern Regions of Massachusetts and "moderate" ozone nonattainment for the Central Region. Massachusetts requested that the Central Region be reclassified as "serious" which was granted, thus making the whole state "serious" non-attainment for ozone. The Federal Register 56 FR 56693 11/6/91 established two serious ozone non-attainment areas covering the whole state: the Boston and Springfield non-attainment areas. The Boston ozone non-attainment area covers the following counties: Worcester, Middlesex, Essex, Suffolk, Norfolk, Bristol, Plymouth, Barnstable, Dukes and Nantucket. The Springfield ozone non-attainment area includes Berkshire, Franklin, Hampshire and Hampden counties. Figure I-1 shows the location of these counties.

For Carbon Monoxide, areas were either designated nonattainment "by operation of law" with passage of the 1990 CAAA if they were considered nonattainment prior to November 1990 or were designated nonattainment based on 1988 or 1989 air monitoring data. For Massachusetts, the cities/towns of Worcester, Lowell, Springfield, Boston, Cambridge, Quincy, Waltham and Medford were designated nonattainment "by operation of law." In addition, EPA originally recommended that the entire Boston CMSA be designated "nonattainment" and classified "moderate".

Massachusetts requested that the new nonattainment area around Boston be reduced from CMSA-wide to a select and limited number of cities and towns around Boston. The result, as published in the Federal Register (56 FR 215) on November 6, 1991 was a much reduced "moderate nonattainment" area comprised of the cities/towns of Boston, Cambridge, Medford, Quincy, Everett, Malden, Somerville, Chelsea and Revere. The remaining pre-existing nonattainment communities of Waltham, Worcester, Springfield and Lowell remained "unclassified nonattainment".

These CO non-attainment areas are presented in Tables I-1 and Figures I-2 and I-3. CO emission inventories for the winter were estimated at the statewide, county and CO non-attainment city/town levels.

I-4 INVENTORY COMPONENTS

The 1990 Base Year Emission Inventories were developed in a similar format as that of 1987 which was the last complete emissions inventory developed for Massachusetts. This 1990 base year emissions inventory is presented as a single document comprising the three precursors of ozone: VOC, NOx, and CO for a typical summer day (TPSD). As described in EPA's Emission Requirements Document for Ozone, a "typical summer day" or, a "typical peak ozone season weekday" or "typical ozone season day", refers to emissions activities and weather conditions that occur during the three month period in which the ten highest ozone exceedances occur (June-August) averaged on a daily basis. EPA's Procedural Documents (Volume IV) were followed for determining a typical ozone or summer day based on Ozone data for the days with the ten highest ozone levels for the last three years (1988 to 1990) and are described in Section C of this document for On-Road Mobile Sources. Emissions were estimated or adjusted for a typical ozone or summer day which is generally from June to August in Massachusetts.

This document also includes CO emissions for a "typical winter day." The peak CO season comprises the contiguous months when the ten highest CO NAAQS exceedance episodes occur during the coldest months of the year, generally from November to January for Massachusetts. This determination is based on ambient CO data for the last three years, 1988 to 1990 as described in Section C of this document. Emissions were estimated for a typical CO or winter day at the statewide, county and CO non-attainment city/town levels.

The VOC emission inventory is subdivided into two basic categories: anthropogenic and biogenic. The anthropogenic emission inventories for VOC, NOx and CO are developed and subdivided into four broad source categories: Stationary Point, Stationary Area, On-Road Mobile and Non-Road Mobile Sources. The Stationary Point Source category (Section A) includes stationary facilities which emit actual emissions over 10 tons per year (TPY) of VOC, over 50 TPY of NOx and 100 TPY of CO. Stationary Area sources are smaller, usually more widespread emitting activities that are too small and numerous to be inventoried as point sources. The Stationary Area source emission categories (Section B) define various activities or processes which can be estimated as a group and include gasoline distribution, solvent use, waste management practices and combustion processes. The On-Road Mobile source inventories (Section C) comprise Mobile5a emission estimates for on-road mobile sources for eight vehicle classes which include cars, trucks and buses. Non-Road Mobile sources include emissions from Aircraft, Railroads, Commercial/Military Vessels and Off-Highway Vehicles which are presented in Section D. The Off-Highway Vehicle emissions, including Recreational Marine vessels, were obtained from EPA's "Non-Road Engine Emission Inventories for CO and Ozone Non-Attainment Boundaries," EPA, Office of Mobile Sources, Ann Arbor, Michigan, December, 1992.

I-5. INVENTORY POLLUTANTS

A Volatile Organic Compound (VOC) as defined in 310 CMR 7.00 is any compound of carbon which either participates in atmospheric reactions or which is measured by the applicable reference methods under 40 CFR 60. The excluded non-reactive VOC compounds are outlined in the Stationary Point Source Section A.

VOC's are generally emitted from industrial, commercial and residential solvent and fuel combustion processes, on-road, non-road mobile sources and biogenic sources. VOC, NOx and CO react photochemically at high temperatures in the presence of sunlight to form ozone. Ozone is a respiratory irritant and can result in adverse health effects as well as damage to materials and vegetation. The federal ozone one-hour standard is set at 0.12 parts per million.

One of the major components of NOx is nitrogen dioxide (NO_2). NOx is generally emitted through fuel combustion by on-road mobile sources, non-road mobile sources and stationary industrial, commercial and residential sources. Even though Massachusetts is in attainment of the annual NO_2 federal standard of 100 ug/m^3, an inventory of NOx is required because they are precursors to ozone.

CO is an asphyxiant gas with a federal one hour standard of 35 ppm and an 8-hour standard of 9 ppm. CO is produced by the same combustion process as described for NO_x. Massachusetts is in non-attainment of the 8-hour standard which generally occurs during the winter period. CO is also a precursor to ozone formation in the summer.

I-6. INVENTORY METHODOLOGY

The general methodology used in developing the emission inventories for Stationary Point, Stationary Area, On-Road Mobile, Non-Road Mobile and Biogenic sources involves the application of activity factors or default values to appropriate emission factors and estimated or adjusted seasonally. Several recent EPA guidance documents provide procedures for estimation of emissions. These EPA documents are referenced for each methodology and source category throughout this report.

The Stationary Point Source (Section A) emissions are originally estimated from a mail survey source registration (Appendix A.2) and DEP field data verification inspections. The activity factor is the quantity and type of material or fuel used. The table of emission factors is based on source classification codes related to the source process type. If control equipment is used at any source, its effectiveness is factored into the equation. Field staff also supplemented data based on plant inspections and manually calculated plant emissions. Stationary point source emissions are initially stored in DAQC SSEIS data base. The SSEIS Point Sources above 10 TPY VOC, 50 TPY NOx and 100 TPY were then downloaded into the SAMS 4.1 software system for uploading into the EPA National Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS).

The Stationary Area Source emissions category (Section B) represent point sources which are too small and numerous to be recorded in the point source inventory. The activity factors include material sales records, State registration records, fuel/material usage, and default employment and per capita data. Emission factors were obtained from EPA guidance documents and some categories were estimated based on State employment and population data. The rule effectiveness formula was applied to those categories which are subject to state regulations in which the control efficiency and rule effectiveness were quantified. In some categories which overlapped with those of the point source inventory, eg. degreasing, the point source employment or fuel/material usage were subtracted from the corresponding area source inventory to avoid double counting. Emissions were apportioned to counties based on available fuel/material used, employment, State registration and population data.

The On-Road Mobile source category (Section C) emissions represent roadway and highway vehicles. The activity factor is daily vehicle miles travelled (DVMT) obtained from the Massachusetts Highway Department (MHD), formerly the Massachusetts Department of Public Works (MDPW). DVMT data was seasonally adjusted for typical summer and winter days for the entire state. Emission factors were developed from EPA's December 1992 MOBILE5a emissions model which required a wide range of input parameters such as vehicle type mix, age distribution, mileage accumulation, temperature, and I/M data such as anti-tampering rates, hot/cold start mix and emission failure rates. Emission factors were calculated for the eight vehicle types for different speeds up to 65 mph. Emission factors were calculated for a worst case scenario for ozone and CO in which the temperatures were based on the 10 days with the highest ozone and CO levels over the last three years. These temperatures are presented in Section C. Emission factors were applied to DVMT based on MHD's speed estimates for each roadway type in each county. Emissions were calculated for the summer for VOC, NOx and CO, and for the winter for CO. Because emissions are not required for the winter for VOC and NOx, mobile source emissions are calculated in tons per summer day and not in

tons per year.

EPA's comments on the On-Road Mobile Section were incorporated into MOBILE5a . The mobile source inputs or criteria sets were entered into the EPA AIRS Area and Mobile Source Subsystem (AMS) System, together with the VMT and Speed data with the assistance of an EPA contractor.

The Non-Road Mobile Source (Section D) includes emissions estimation from different types of engines used by Aircraft, Locomotives, Commercial/Military Vessels, and other Off-Highway vehicles. The basic activity level is the estimation of the amount and type of fuel used for each activity and applied to appropriate emission factors. Resultant emission estimates were apportioned to counties based on state registration data employment and demographic data. The Off-Highway Non-Road Mobile source emissions including Recreational Marine Vessels were taken from EPA Office of Mobile Sources (OMS) Non-Road Engine Study and is presented in Section D.4.

The Biogenic hydrocarbon emissions category is being inventoried for the first time and is presented in Section E. The EPA PC-BEIS model was utilized to estimate biogenic emissions. The model incorporates default land use, crop acreage and forest type by county, and assigns emission rates to different land use types. The model estimates emissions based on calculations using crop acreage and leaf biomass for the summer growing season. The model utilizes inputs such as meteorological data which includes temperature and insolation for the typical summer day.

I-7. EMISSIONS SUMMARY

The 1990 base year emissions were calculated in tons per summer day (TPSD) for VOC, NOx and CO. Emissions were also calculated in tons per winter day (TPWD) for CO.

Emissions were developed and presented for anthropogenic emissions comprising the following four broad categories: Stationary Point, Stationary Area, On-Road Mobile5a and Non-Road Mobile Sources. Biogenic emissions were developed and presented for the VOC summer day inventory. Emissions were developed and presented by county in Tables I-4 to I-22 and Figures I-9 to I-13. CO winter emissions by CO non-attainment cities and towns are presented in Table I-19 and Figure I-14.

In the statewide anthropogenic VOC inventory for a typical summer day, the source categories account for the following contributions: Stationary Point 5.3%, Stationary Area 38.0%, On-Road MOBILE5.a 28.5% and Non-Road Mobile 28.2%. The inclusion of Biogenic emissions changes to the following proportions: Stationary Point 3.3%, Stationary Area 23.5%, On-Road Mobile5a 17.7%, Non-Road Mobile 17.4% and Biogenics 38.1%. These proportions are presented in Table I-2 and Figures I-4 and I-5.

The following are the proportions of the source categories statewide for a typical summer day for NO_x: Stationary Point 37.7%, Stationary Area 3.4%, On-Road Mobile5a 40.5% and Non-Road Mobile 18.4%. NOx emissions for these categories are presented in Table I-2 and Figure I-6.

The following are the proportions of the source categories statewide for the CO inventory for a typical summer day: Stationary Point 0.9%, Stationary Area 1.4%, On-Road Mobile5a 61.2% and Non-Road Mobile 36.5%. The contributions of the CO summer source categories are presented in Table I-2 and Figure I-7.

The proportions of the CO winter day inventory are as follows: Stationary Point 0.8%, Stationary Area 16.8%, On-Road Mobile5a 79.9% and Non-Road Mobile 2.6%. The contributions of the source categories are presented in Table I-2 and Figure I-8. CO winter emissions by counties were apportioned by population to CO non-attainment cities and towns in Table I-18 and presented in Figure I-14.

Table I-3 presents a breakdown of the summer day emissions for the two Ozone Non-attainment areas : Boston and Springfield. The counties comprising these Ozone Non-attainment and their emissions are presented in Table I-20 to I-22. Table I-3 shows that the Boston Non-attainment area accounts for 85 to 88 percent of the anthropogenic emissions for VOC, NOx and CO.

wp file: overview

TABLE I-1

AREA DESIGNATION

OZONE : NONATTAINMENT "SERIOUS" -STATEWIDE

CARBON MONOXIDE : NONATTAINMENT "MODERATE" IN
- BOSTON
- CAMBRIDGE
- QUINCY
- MEDFORD
- REVERE
- MALDEN
- CHELSEA
- EVERETT
- SOMERVILLE

NONATTAINMENT "UNCLASSIFIED" IN
- WORCESTER
- SPRINGFIELD
- LOWELL
- WALTHAM

NITROGEN DIOXIDE : ATTAINMENT STATEWIDE

INHALABLE PARTICULATES : UNCLASSIFIED

SULFUR DIOXIDE : ATTAINMENT STATEWIDE

FIGURE I-1

MASSACHUSETTS - COUNTIES AND AIR POLLUTION CONTROL DISTRICTS

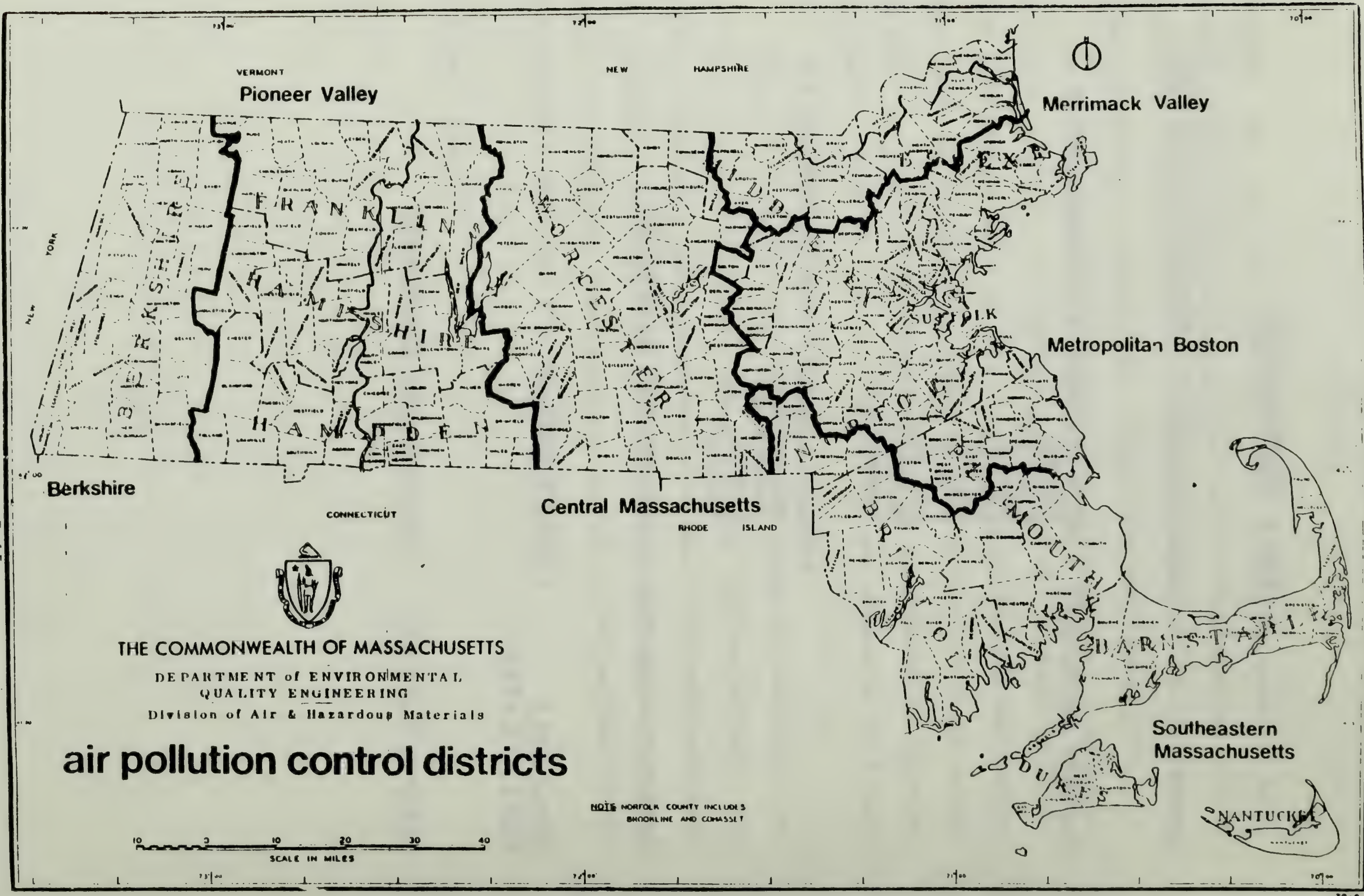
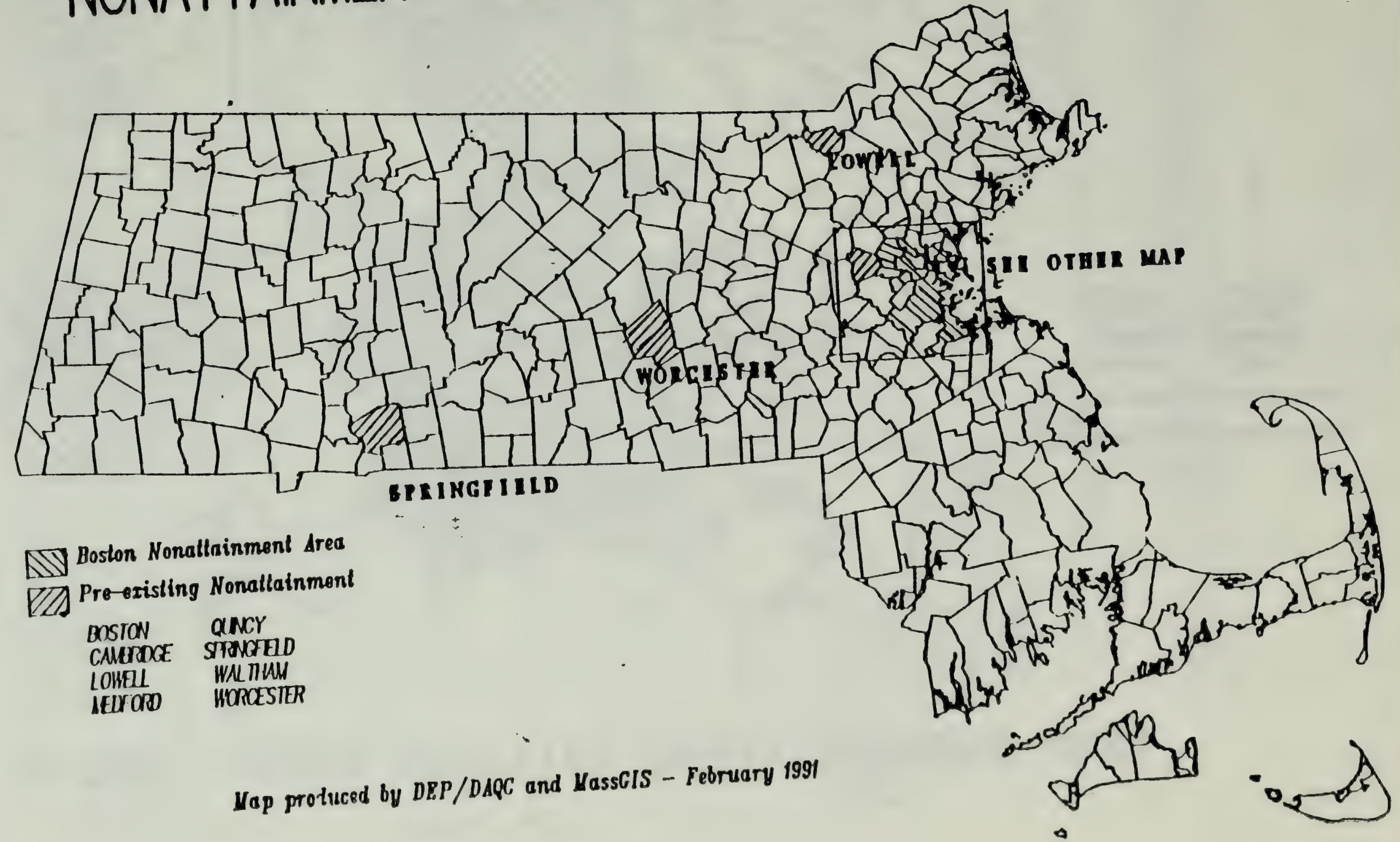

VERMONT
NEW HAMPSHIRE
Pioneer Valley
Merrimack Valley
NEW YORK
BERKSHIRE
FRANKLIN
HAMPSHIRE
HAMPDEN
WORCESTER
MIDDLESEX
ESSEX
SUFFOLK
NORFOLK
PLYMOUTH
BRISTOL
BARNSTABLE
DUKES
NANTUCKET
Metropolitan Boston
Berkshire
CONNECTICUT
Central Massachusetts
RHODE ISLAND
Southeastern Massachusetts
THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT of ENVIRONMENTAL QUALITY ENGINEERING
Division of Air & Hazardous Materials
air pollution control districts
NOTE NORFOLK COUNTY INCLUDES BROOKLINE AND COHASSET
10 0 10 20 30 40
SCALE IN MILES

FIGURE 1 - 2

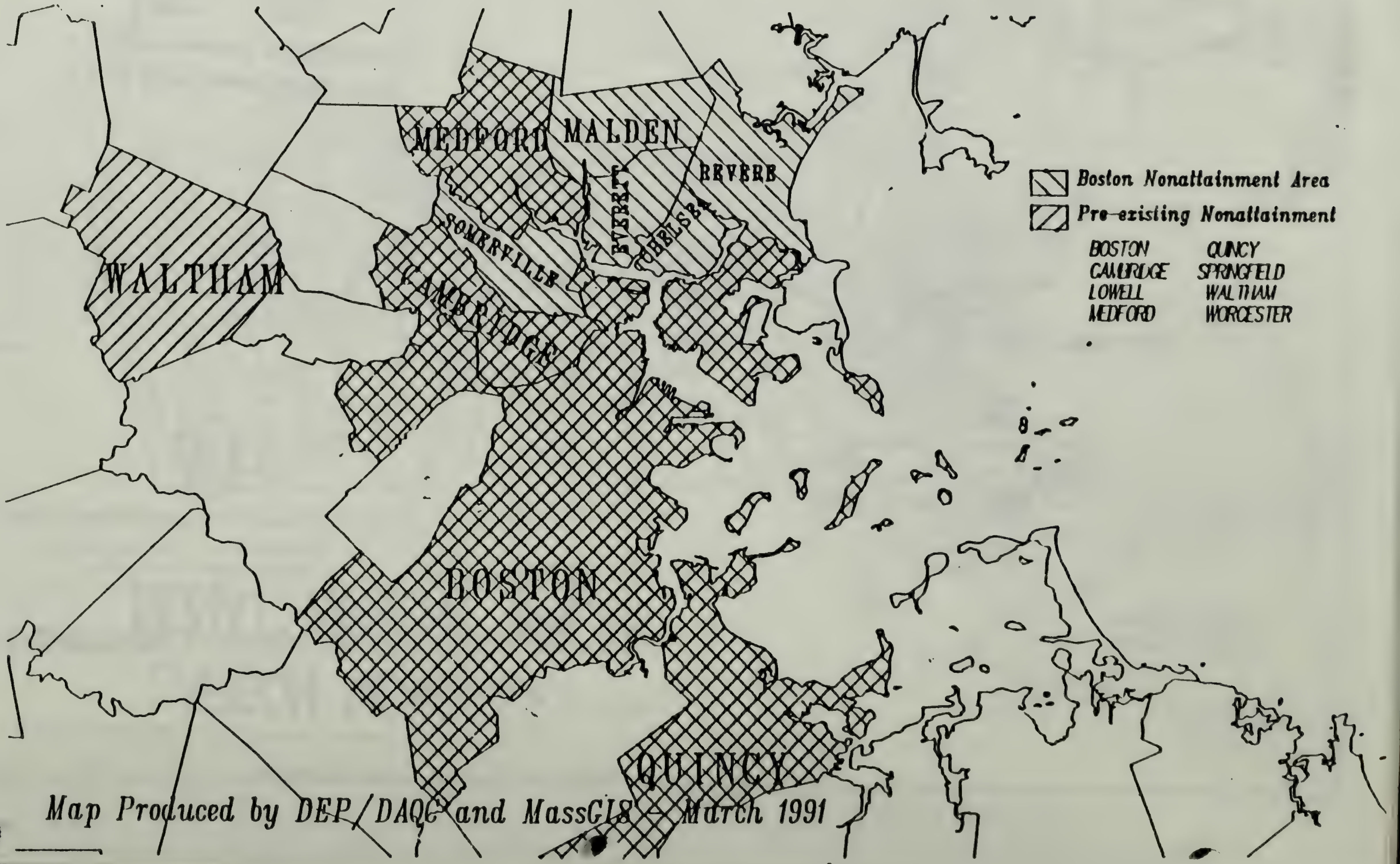
CARBON MONOXIDE NONATTAINMENT AREAS


LOWELL
SEE OTHER MAP
WORCESTER
SPRINGFIELD
▧ Boston Nonattainment Area
▨ Pre-existing Nonattainment
BOSTON
CAMBRIDGE
LOWELL
MEDFORD
QUINCY
SPRINGFIELD
WALTHAM
WORCESTER

Map produced by DEP/DAQC and MassGIS - February 1991

FIGURE - I-3

BOSTON CARBON MONOXIDE NONATTAINMENT AREA


WALTHAM
MEDFORD
MALDEN
REVERE
EVERETT
CHELSEA
SOMERVILLE
CAMBRIDGE
BOSTON
QUINCY
▧ Boston Nonattainment Area
▨ Pre-existing Nonattainment
BOSTON
CAMBRIDGE
LOWELL
MEDFORD
QUINCY
SPRINGFIELD
WALTHAM
WORCESTER

Map Produced by DEP/DAQC and MassGIS - March 1991

TABLE I-2

SUMMARY MASSACHUSETTS 1990 BASE YEAR EMISSION INVENTORIES VOLATILE ORGANIC COMPOUNDS, NITROGEN OXIDES AND CARBON MONOXIDE (TONS PER SUMMER AND WINTER DAY)

Revised Nov 8 93 (Based on Public Hearing Comments)
4suminv90

VOLATILE ORGANIC COMPOUNDS (VOC)

	TONS PER SUMMER DAY (TPSD)	%	ANTHROPOGENIC (NO BIOGENICS) TONS PER SUMMER DAY (TPSD)	%
1 STATIONARY POINT	56.34	3.29%	56.34	5.32%
2 STATIONARY AREA	402.52	23.53%	402.52	38.00%
3 ON-ROAD MOBILE5.a	302.22	17.67%	302.22	28.53%
4 NON-ROAD MOBILE	298.14	17.43%	298.14	28.15%
5 BIOGENICS	651.24	38.07%		
TOTAL	1710.46		1059.22	

NITROGEN OXIDES (NOx)

	TONS PER SUMMER DAY (TPSD)	%
1 STATIONARY POINT	360.63	37.71%
2 STATIONARY AREA	32.49	3.40%
3 ON-ROAD MOBILE5.a	386.93	40.46%
4 NON-ROAD MOBILE	176.18	18.42%
TOTAL	956.23	

CARBON MONOXIDE (CO)

	TONS PER SUMMER DAY (TPSD)	%	TONS PER WINTER DAY (TPWD)	%
1 STATIONARY POINT	32.77	0.88%	32.77	0.77%
2 STATIONARY AREA	53.44	1.44%	711.95	16.78%
3 ON-ROAD MOBILE5.a	2268.26	61.15%	3387.69	79.87%
4 NON-ROAD MOBILE	1354.68	36.52%	109.36	2.58%
TOTAL	3709.15		4241.77	

TABLE I-3

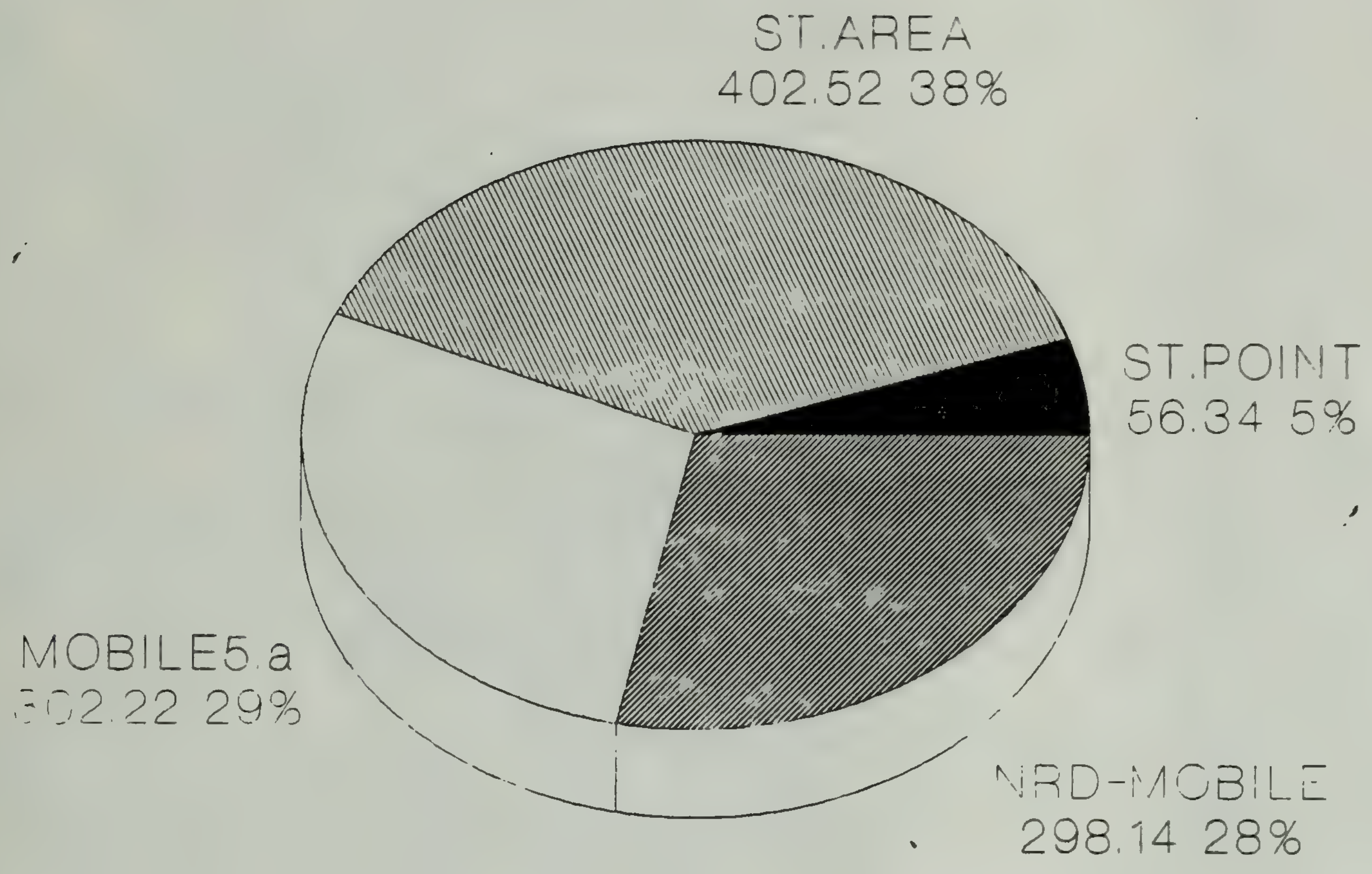
SUMMARY MASSACHUSETTS 1990 BASE YEAR EMISSION INVENTORIES
VOC, NOX AND CO TONS PER SUMMER AND WINTER DAY
FOR BOSTON AND SPRINGFIELD OZONE NON-ATTAINMENT AREAS

Revised Nov 8 93 (Based on Public Hearing Comments)
sumNAA90b6

	BOSTON NON-ATTAINMENT AREA TONS SUMMER DAY	SPRINGFIELD NON-ATTAINMENT AREA TONS SUMMER DAY	STATE TOTAL
ANTHROPOGENIC VOC			
1 STATIONARY POINT	46.682	9.660	56.342
2 STATIONARY AREA	348.821	53.694	402.515
3 ON-ROAD MOBILE5.a	249.769	52.452	302.221
4 NON-ROAD MOBILE	255.182	42.953	298.135
TOTAL ANTHROPOGENIC	900.454	158.759	1059.213
	85.0%	15.0%	
VOC WITH BIOGENICS			
1 STATIONARY POINT	46.682	9.660	56.342
2 STATIONARY AREA	348.821	53.694	402.515
3 ON-ROAD MOBILE5.a	249.769	52.452	302.221
4 NON-ROAD MOBILE	255.182	42.953	298.135
5 BIOGENICS	374.020	277.220	651.24
TOTAL VOC	1274.474	435.979	1710.453
	74.5%	25.5%	
NITROGEN OXIDES (NOx)			
1 STATIONARY POINT	333.266	27.369	360.635
2 STATIONARY AREA	28.092	4.396	32.488
3 ON-ROAD MOBILE5.a	319.681	67.253	386.934
4 NON-ROAD MOBILE	156.278	19.904	176.182
TOTAL	837.317	118.922	956.239
	87.6%	12.4%	
CARBON MONOXIDE (CO)			
1 STATIONARY POINT	26.942	5.824	32.766
2 STATIONARY AREA	45.508	7.927	53.435
3 ON-ROAD MOBILE5.a	1886.622	381.639	2268.261
4 NON-ROAD MOBILE	1176.459	178.218	1354.677
TOTAL	3135.531	573.608	3709.139
	84.5%	15.5%	

FIGURE I-4

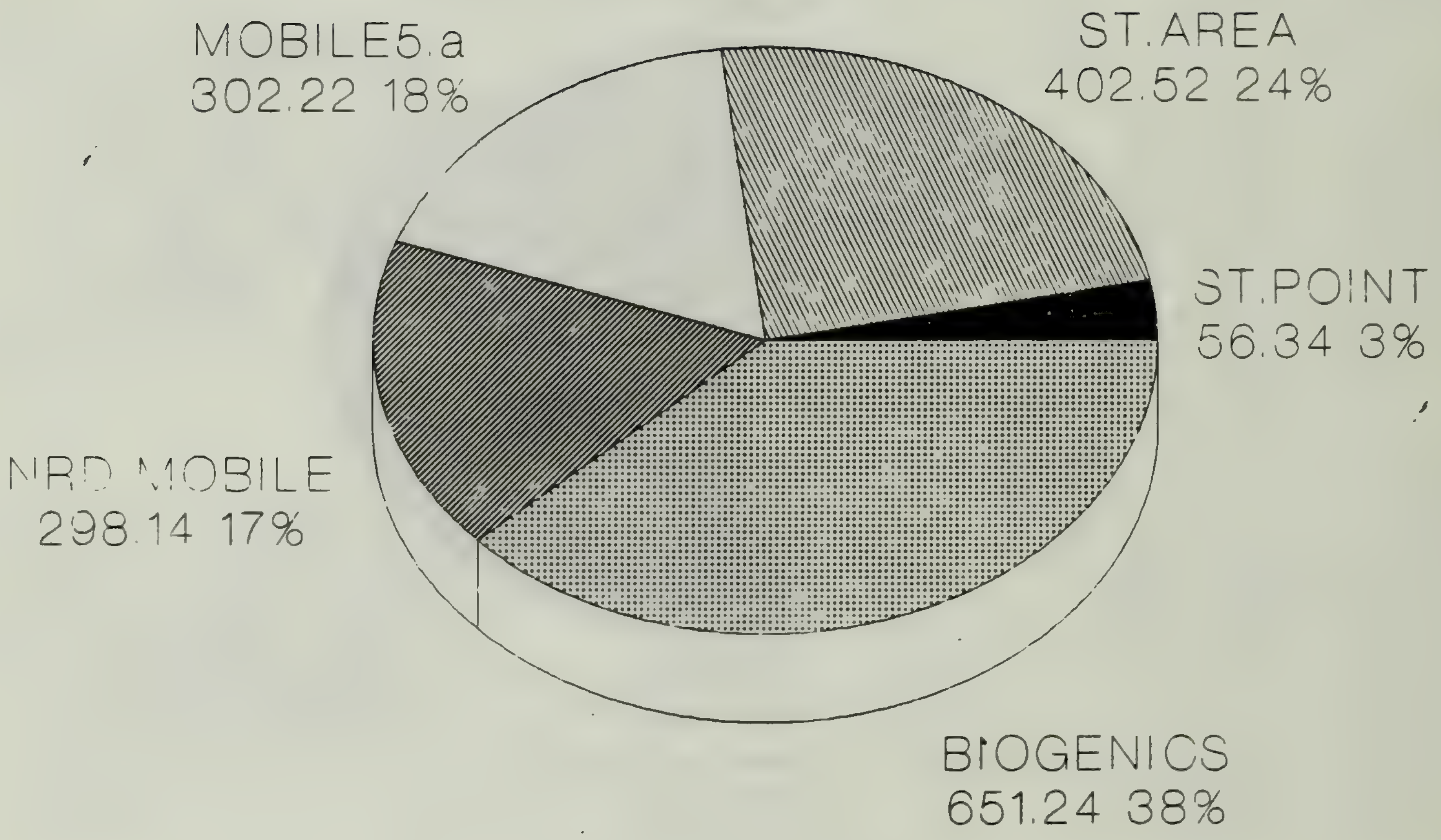
VOC ANTHROPOGENIC EMISSIONS 1990
TONS PER SUMMER DAY



ST.POINT,ST.AREA,MOBILE-5,NON-RD

FIGURE I-5

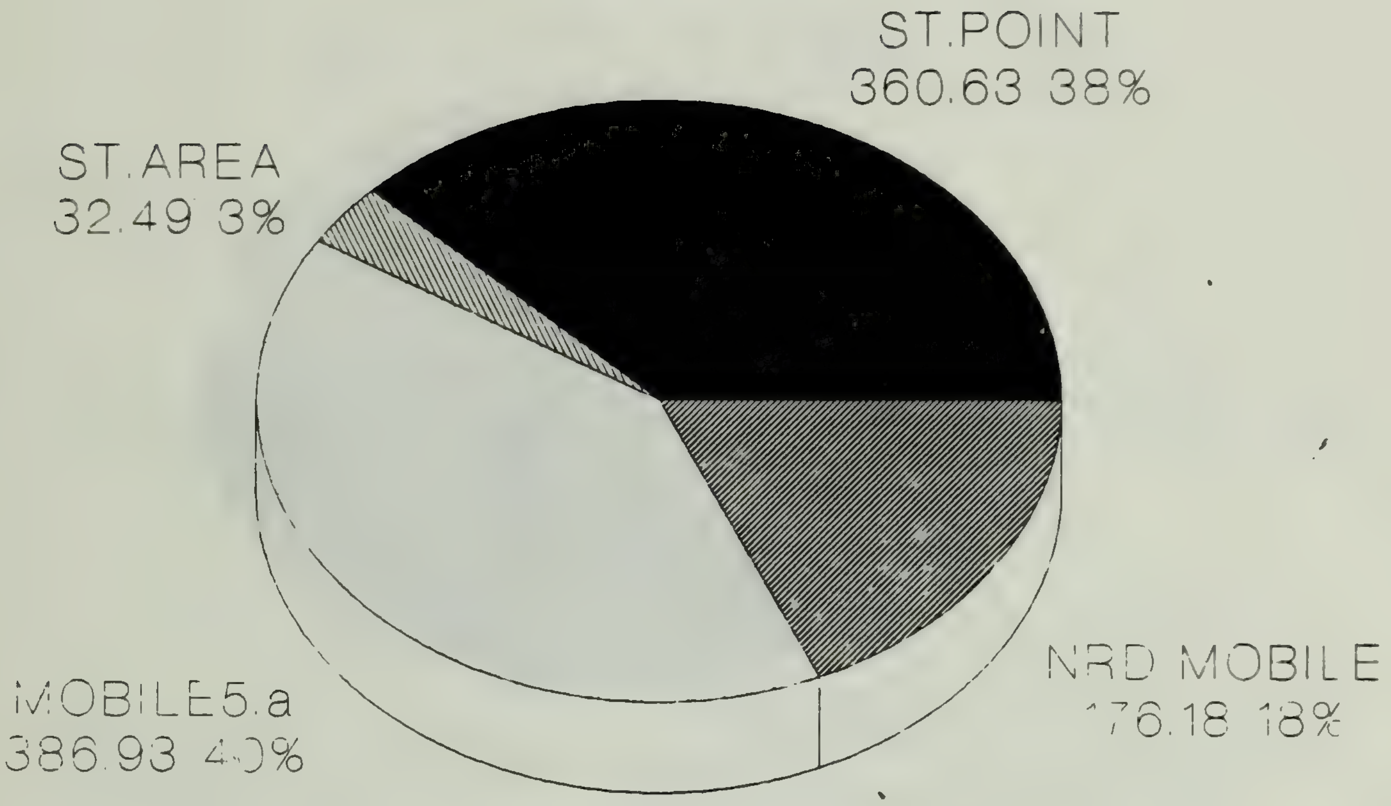
VOC EMISSIONS WITH BIOGENICS 1990
TONS PER SUMMER DAY



ALL CATEGORIES INCLUDING BIOGENICS

FIGURE I-6

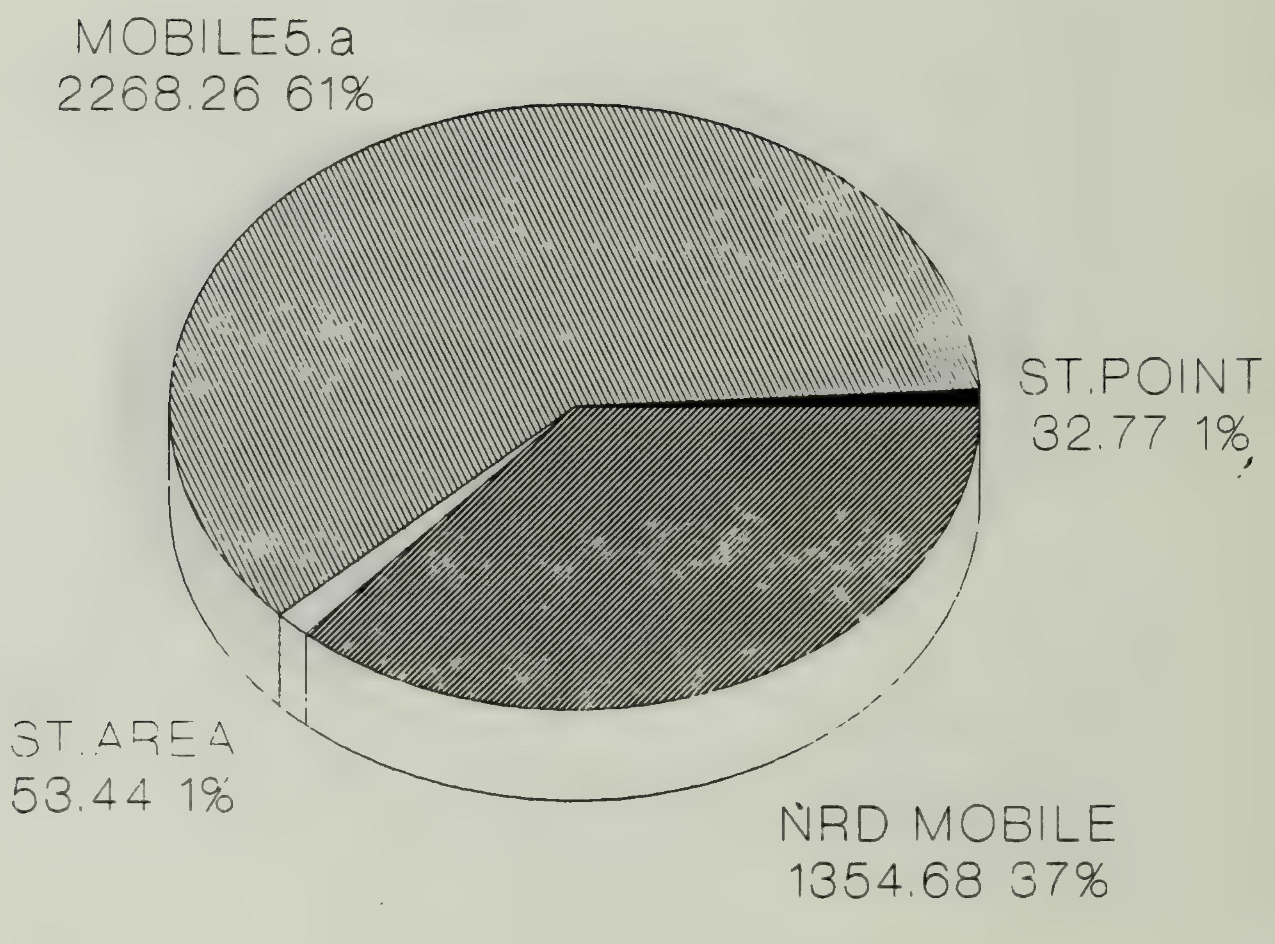
NOX EMISSIONS 1990
TONS PER SUMMER DAY



ST.POINT,ST.AREA,MOBILE-5,NON-RD MOBILE

FIGURE I-7

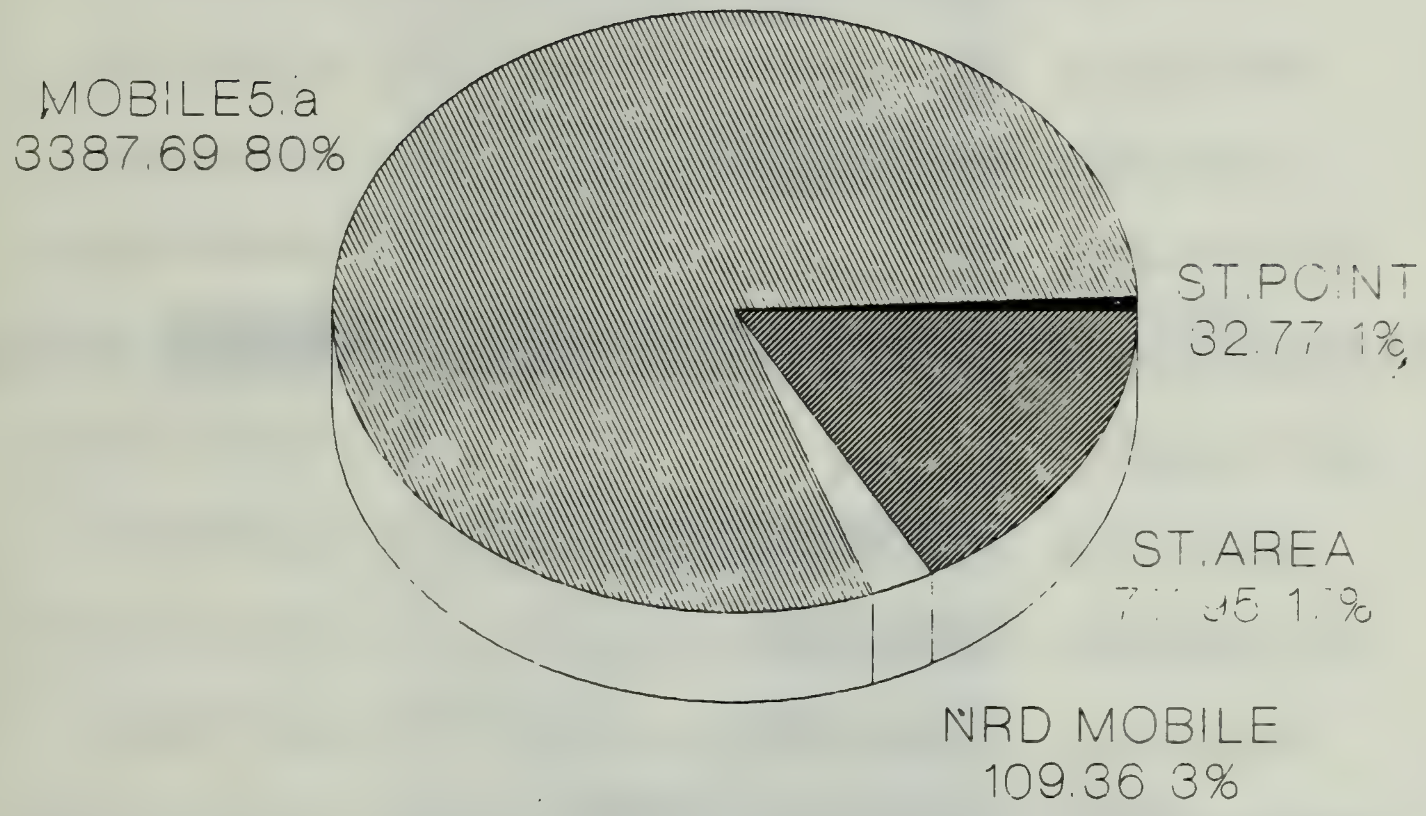
CO EMISSIONS 1990
TONS PER SUMMER DAY



ST.POINT,ST.AREA,MOBILE-5,NON-RD MOBILE

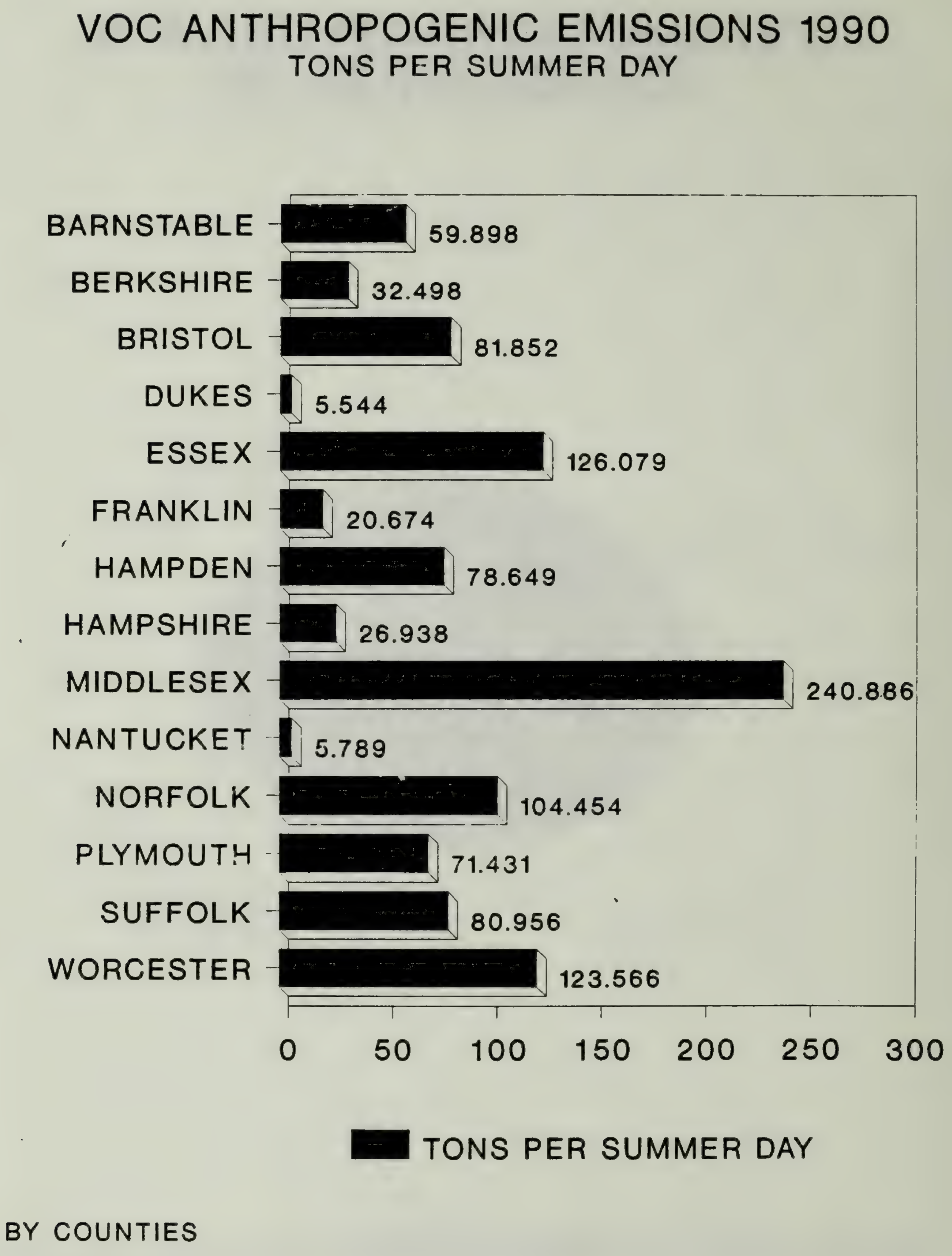
FIGURE I-8

CO EMISSIONS WINTER 1990
TONS PER WINTER DAY



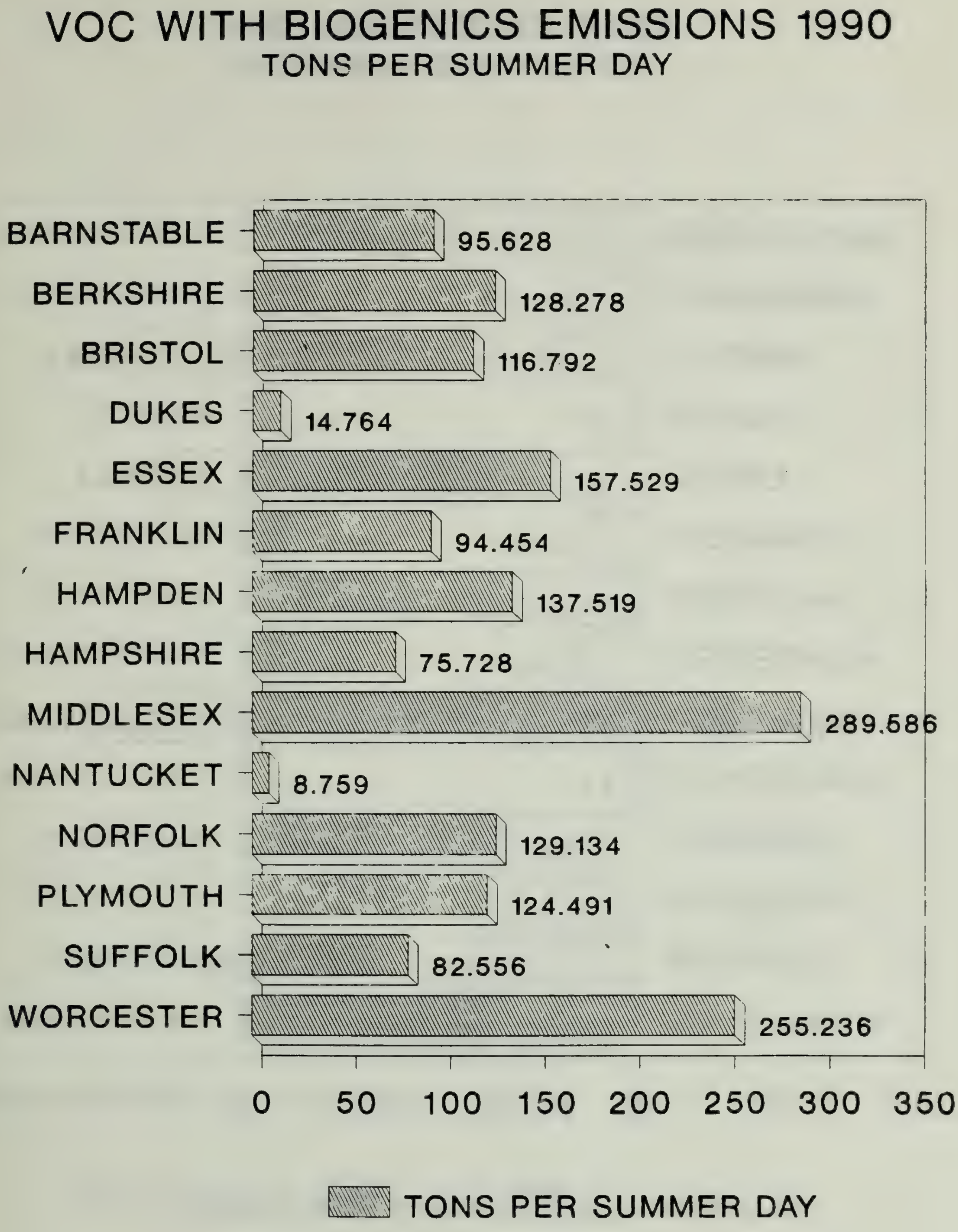
ST.POINT,MOBILE-5,ST.AREA,NRD MOBILE

FIGURE I-9


VOC ANTHROPOGENIC EMISSIONS 1990
TONS PER SUMMER DAY

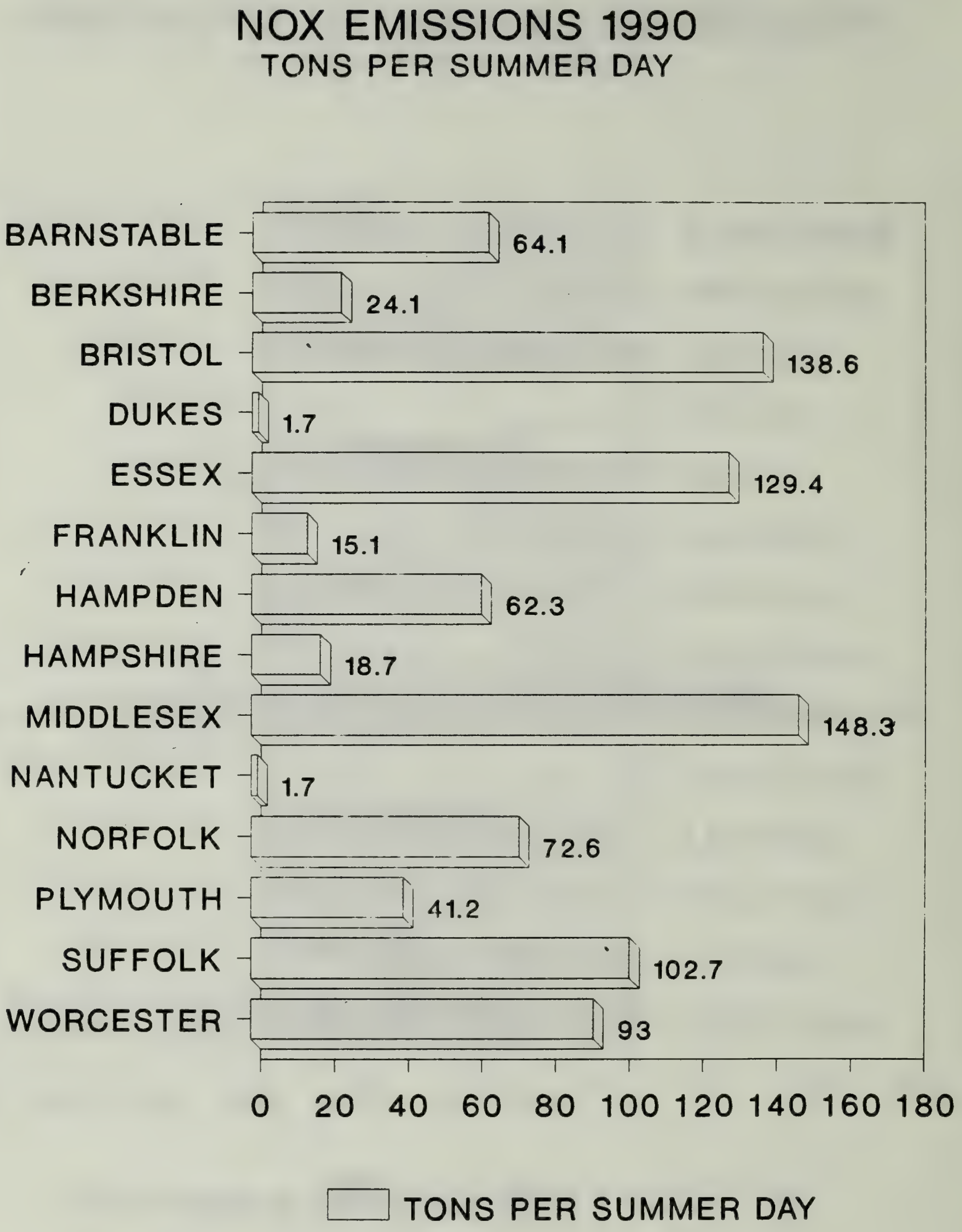
BY COUNTIES

FIGURE I-10

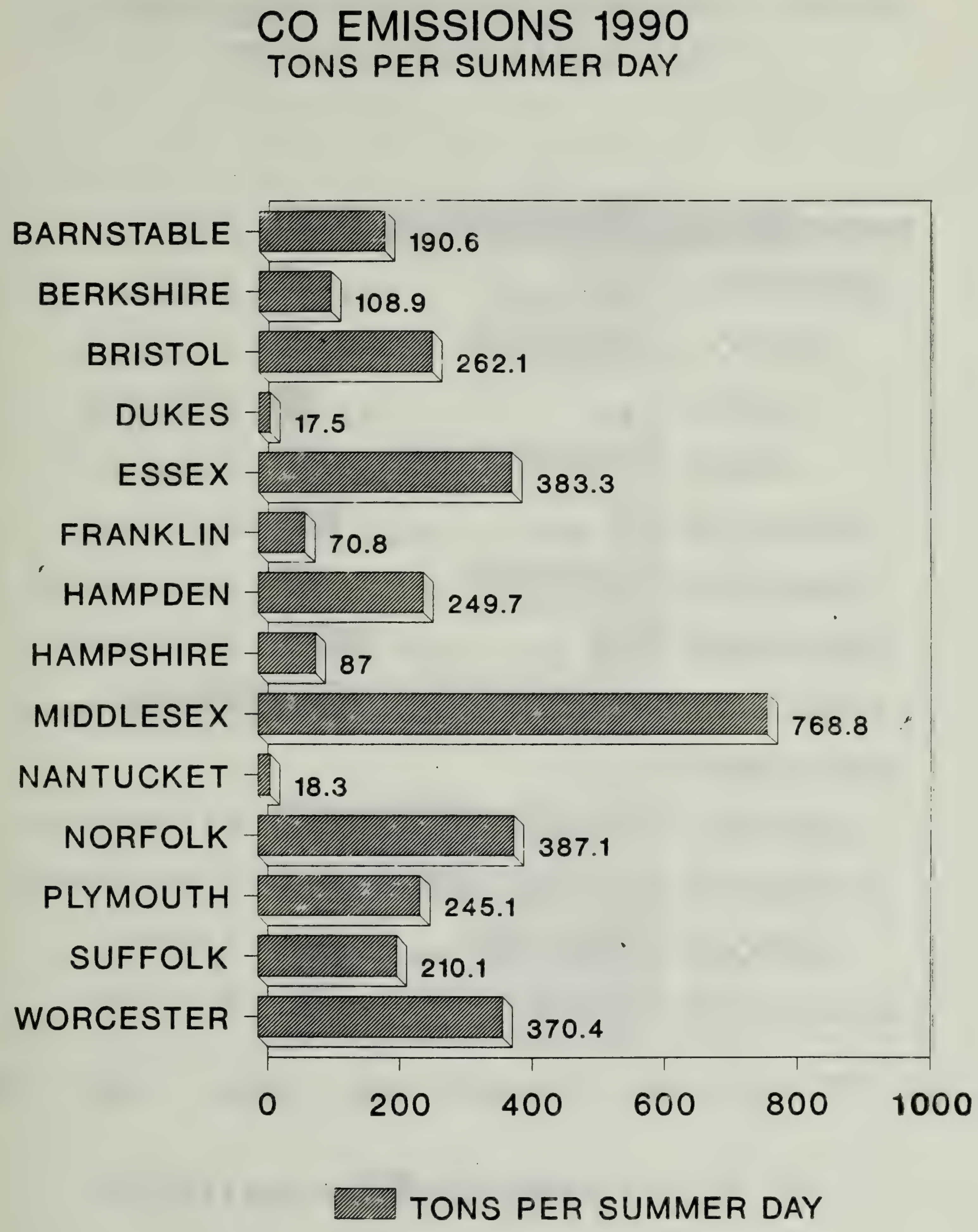


BY COUNTIES

FIGURE I-11

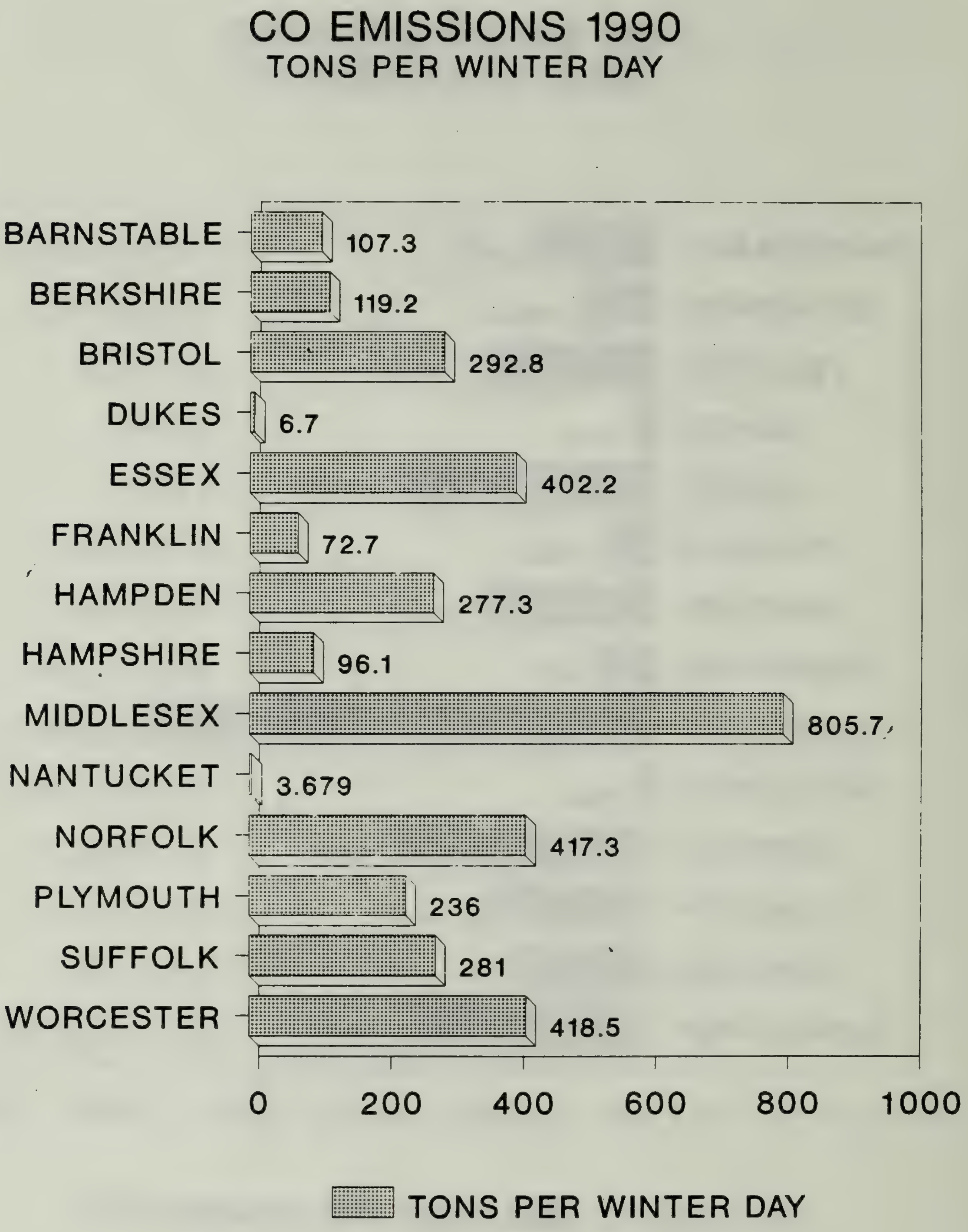


BY COUNTIES


CO EMISSIONS 1990
TONS PER SUMMER DAY
BARNSTABLE
190.6
BERKSHIRE
108.9
BRISTOL
262.1
DUKES
17.5
ESSEX
383.3
FRANKLIN
70.8
HAMPDEN
249.7
HAMPSHIRE
87
MIDDLESEX
768.8
NANTUCKET
18.3
NORFOLK
387.1
PLYMOUTH
245.1
SUFFOLK
210.1
WORCESTER
370.4
0
200
400
600
800
1000
▨ TONS PER SUMMER DAY

BY COUNTIES

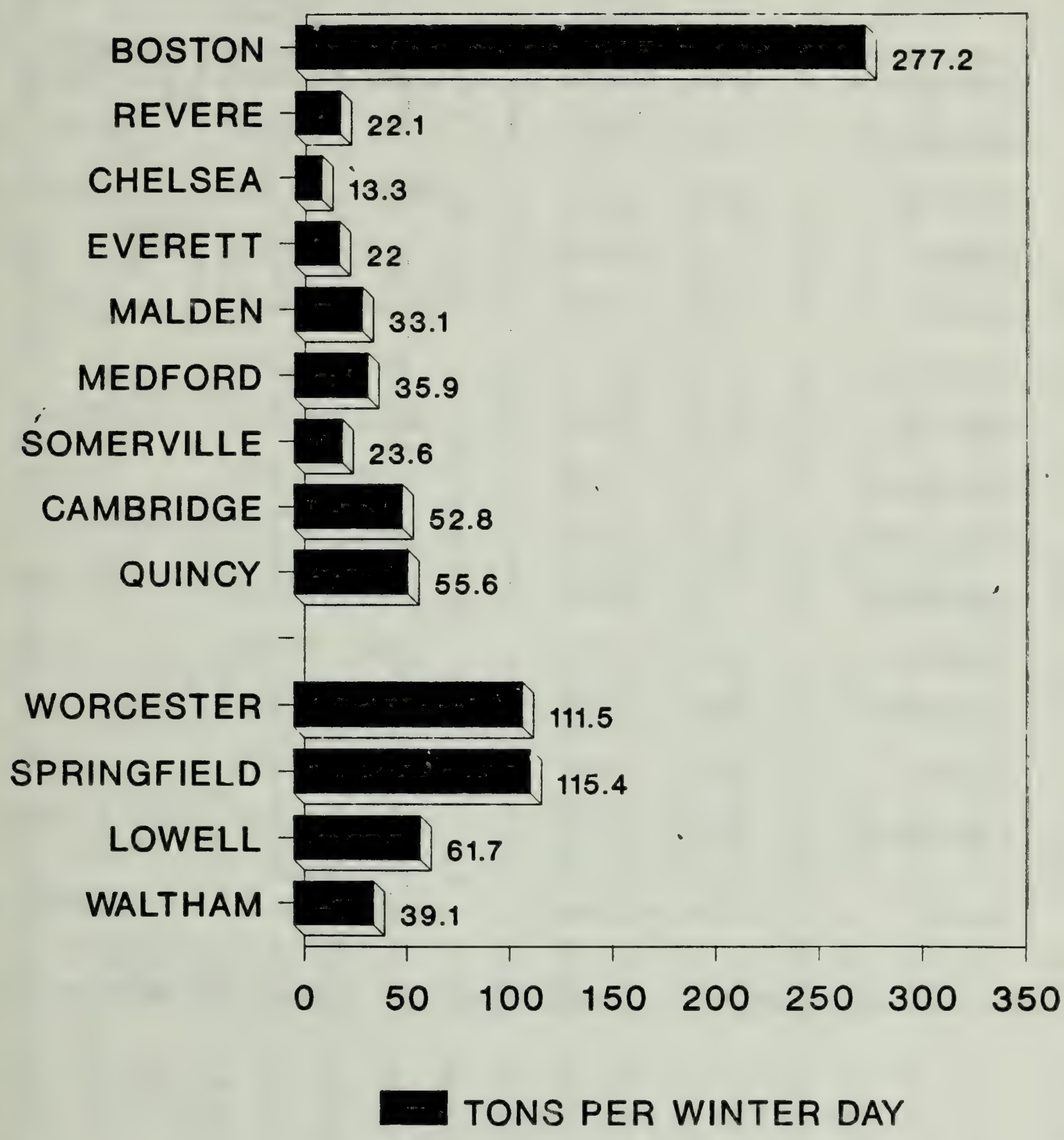
FIGURE I-13



BY COUNTIES

FIGURE I-14

CO EMISSIONS NON-ATTAINMENT AREAS
TONS PER WINTER DAY



BY CITY/TOWN

TABLE I-4

STATIONARY POINT SOURCE EMISSIONS BY COUNTIES 1990
VOC, NOX AND CO

pointcty3
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TABLE A-2

COUNTIES	VOC TPY	VOC TPSD* /52*6	NOX TPY	NOX TPSD* /52*6	CO TPY	CO TPSD* TPWD* /52*6
BARNSTABLE	172	0.551	13982	44.814	1555	4.984
BERKSHIRE	333	1.067	917	2.939	277	0.888
BRISTOL	2314	7.417	40459	129.68	1950	6.250
DUKES	0	0.000	0	0.000	0	0.000
ESSEX	2105	6.747	22354	71.647	1315	4.215
FRANKLIN	97	0.311	423	1.356	28	0.090
HAMPDEN	2448	7.846	6181	19.811	1155	3.702
HAMPSHIRE	136	0.436	1018	3.263	357	1.144
MIDDLESEX	4129	13.234	2235	7.163	329	1.054
NANTUCKET	37	0.119	1722	5.519	184	0.590
NORFOLK	1153	3.696	654	2.096	144	0.462
PLYMOUTH	484	1.551	143	0.458	105	0.337
SUFFOLK	1873	6.003	18686	59.891	2274	7.288
WORCESTER	2298	7.365	3744	12.000	550	1.763
STATE	17579	56.343	112518	360.63	10223	32.766

* /52*6 : ACTIVITY IS ESTIMATED AT 6 DAYS PER WEEK AT 52 WEEKS

TABLE I-5

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STATIONARY AREA SOURCE VOC EMISSIONS 1990 TONS PER YEAR (TPY) AND SUMMER DAY (TPSD)

3areacty COUNT	1 WASTE MGT TPY	1 WASTE MGT TPSD	2 GASOL DIST TPY	2 GASOL DIST TPSD	3 SOLVENT EVAP TPY	3 SOLVENT EVAP TPSD	4 FUEL COM & FIRES TPY	4 FUEL COM & FIRES TPSD	TOTAL STATIONARY AREA EMIS VOC TPY	TOTAL STATIONARY AREA EMIS VOC TPSD
1 BARNS	138.84	0.383	1759.29	4.900	2227.26	7.669	636.09	0.528	4761.48	13.480
2 BERKS	367.57	1.184	255.84	0.857	2578.43	9.052	473.08	0.292	3674.92	11.385
3 BRIST	676.95	2.003	761.13	2.269	7373.59	25.330	1607.37	0.850	10419.04	30.452
4 DUKES	11.94	0.033	18.64	0.058	148.89	0.515	59.36	0.060	238.83	0.666
5 ESSEX	2742.76	8.911	464.94	1.512	12129.06	42.700	2066.98	1.004	17403.74	54.127
6 FRANK	120.45	0.387	51.97	0.170	1358.06	4.835	231.01	0.121	1761.49	5.513
7 HAMPD	805.89	2.608	316.13	1.029	6631.53	23.023	1472.78	0.797	9226.33	27.457
8 HAMPS	246.30	0.752	96.09	0.313	2334.85	8.048	477.76	0.226	3155.00	9.339
9 MIDDL	701.42	2.059	965.24	3.141	27314.02	94.266	4113.80	1.717	33094.48	101.183
10 NANTU	8.27	0.023	12.34	0.038	121.40	0.389	39.37	0.042	181.38	0.492
11 NORFO	500.10	1.411	636.56	1.966	9633.11	32.762	1869.21	0.902	12638.98	37.041
12 PLYMO	470.15	1.337	312.14	1.016	5809.64	20.110	1346.71	0.716	7938.64	23.179
13 SUFFO	11.01	0.030	3342.70	9.332	8687.86	29.531	2144.39	1.167	14185.96	40.060
14 WORCE	628.76	1.903	500.46	1.627	12496.77	43.622	2136.87	0.989	15762.86	48.141
STATE	7430.41	23.024	9493.47	28.228	98844.47	341.85	18674.78	9.411	134443.13	402.515
								qc	134443.13	402.515

TABLE I-6

STATIONARY AREA SOURCE NOX EMISSIONS 1990 TPY AND TPSD

areactNO

	COUNTIES	FUEL COMB TPY	FUEL COMB TPSD	FOREST FIRE TPY	FOREST FIRE TPSD	STRUCT FIRE TPY	STRUCT FIRE TPSD	TOTAL FUEL COMB & FIRES TPY	TOTAL FUEL COMB & FIRES TPSD
	=========	======	=====	=====	=====	=====	=====	=====	=====
1	BARNSTABLE	832.59	0.997	2.11	0.002	4.05	0.010	838.75	1.009
2	BERKSHIRE	621.76	0.744	2.88	0.002	3.67	0.009	628.31	0.755
3	BRISTOL	2259.12	2.705	3.27	0.003	15.89	0.039	2278.28	2.747
4	DUKES	51.93	0.062	1.46	0.001	0.19	0.000	53.58	0.063
5	ESSEX	2989.76	3.580	4.28	0.003	12.42	0.030	3006.46	3.613
6	FRANKLIN	312.74	0.374	1.65	0.001	1.12	0.003	315.51	0.378
7	HAMPDEN	2035.96	2.438	5.39	0.004	12.81	0.031	2054.16	2.473
8	HAMPSHIRE	653.96	0.783	3.65	0.003	1.59	0.004	659.2	0.790
9	MIDDLESEX	6239.67	7.471	2.25	0.002	14.26	0.035	6256.18	7.508
10	NANTUCKET	26.82	0.032	1.22	0.001	0.32	0.001	28.36	0.034
11	NORFOLK	2748.85	3.291	2.26	0.002	10.57	0.026	2761.68	3.319
12	PLYMOUTH	1942.11	2.325	2.39	0.002	9.09	0.022	1953.59	2.349
13	SUFFOLK	2962.21	3.547	0.00	0.000	32.81	0.080	2995.02	3.627
14	WORCESTER	3166.56	3.791	1.52	0.001	12.58	0.031	3180.66	3.823
	STATE	26844.04	32.140	34.33	0.027	131.37	0.321	27009.74	32.488
								27009.74	32.488

TABLE I-7

STATIONARY AREA SOURCE CO EMISSIONS 1990 TPY, TPSD AND TPWD

areactCO

COUNTIES	FUEL COMB TPY	FUEL COMB TPSD	FUEL COMB TPWD	FOREST FIRE TPY	FOREST FIRE TPSD	FOREST FIRE TPWD	STRUCT FIRE TPY	STRUCT FIRE TPSD	STRUCT FIRE TPWD	TOTAL FUEL COMB & FIRES CO TPY	TOTAL FUEL COMB & FIRES CO TPSD	TOTAL FUEL COMB & FIRES CO TPWD
=========	======	=====	=====	=====	=====	=====	=====	=====	=====	=======	=======	=======
1 BARNSTABLE	4063.89	1.165	21.513	164.42	0.133	0.118	173.40	0.422	0.506	4401.71	1.720	22.137
2 BERKSHIRE	3034.81	0.870	16.065	223.98	0.181	0.160	157.08	0.382	0.459	3415.87	1.433	16.684
3 BRISTOL	11026.76	3.162	58.371	254.05	0.205	0.182	681.16	1.658	1.989	11961.97	5.025	60.542
4 DUKES	253.47	0.073	1.342	113.23	0.091	0.081	8.16	0.020	0.024	374.86	0.184	1.447
5 ESSEX	14593.03	4.185	77.250	333.03	0.269	0.238	532.44	1.296	1.555	15458.5	5.750	79.043
6 FRANKLIN	1526.47	0.438	8.080	128.26	0.104	0.092	48.14	0.117	0.141	1702.87	0.659	8.313
7 HAMPDEN	9937.54	2.850	52.605	419.23	0.339	0.300	548.96	1.337	1.603	10905.73	4.526	54.508
8 HAMPSHIRE	3191.96	0.915	16.897	284.12	0.229	0.203	67.93	0.165	0.198	3544.01	1.309	17.298
9 MIDDLESEX	30455.89	8.734	161.221	175.08	0.141	0.125	610.98	1.488	1.784	31241.95	10.363	163.130
10 NANTUCKET	130.93	0.038	0.693	94.96	0.077	0.068	13.67	0.033	0.040	239.56	0.148	0.801
11 NORFOLK	13417.17	3.848	71.025	175.84	0.142	0.126	453.08	1.103	1.323	14046.09	5.093	72.474
12 PLYMOUTH	9479.46	2.718	50.180	185.73	0.150	0.133	389.64	0.949	1.138	10054.83	3.817	51.451
13 SUFFOLK	14458.57	4.146	76.538	0.00	0.000	0.000	1405.97	3.423	4.106	15864.54	7.569	80.644
14 WORCESTER	15455.98	4.432	81.818	117.99	0.095	0.084	538.97	1.312	1.574	16112.94	5.839	83.476
STATE	131025.93	37.574	693.598	2669.92	2.156	1.910	5629.58	13.705	16.440	139325.43	53.435	711.948
										139325.43	53.435	711.948

TABLE I-8

ON-ROAD MOBILE5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -VOC
TONS PER SUMMER DAY

5vocmobct
nov 5 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	=========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	7.666	0.818	0.468	0.356	0.020	0.003	0.154	0.341	9.826
2	BERKSHIRE	9.150	0.952	0.543	0.471	0.023	0.003	0.322	0.367	11.831
3	BRISTOL	20.382	1.944	1.107	0.812	0.051	0.006	0.500	0.650	25.452
4	DUKES	0.452	0.059	0.034	0.025	0.001	0.000	0.011	0.027	0.609
5	ESSEX	27.588	2.613	1.490	1.129	0.069	0.008	0.756	0.895	34.548
6	FRANKLIN	5.787	0.668	0.380	0.342	0.015	0.002	0.239	0.289	7.722
7	HAMPDEN	18.464	1.798	1.026	0.786	0.046	0.005	0.559	0.645	23.329
8	HAMPSHIRE	7.529	0.776	0.444	0.337	0.020	0.002	0.182	0.280	9.570
9	MIDDLESEX	53.199	5.044	2.874	2.116	0.132	0.015	1.400	1.745	66.525
10	NANTUCKET	0.196	0.031	0.018	0.014	0.001	0.000	0.006	0.016	0.282
11	NORFOLK	28.94	2.719	1.548	1.139	0.072	0.008	0.76	0.927	36.113
12	PLYMOUTH	16.375	1.600	0.913	0.710	0.041	0.005	0.434	0.592	20.670
13	SUFFOLK	13.351	1.207	0.689	0.537	0.036	0.004	0.334	0.397	16.555
14	WORCESTER	30.620	3.065	1.743	1.439	0.077	0.009	1.024	1.212	39.189
	STATE qc	239.699	23.294	13.277	10.213	0.604	0.070	6.681	8.383	302.221 302.221

TABLE I-9

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -NOX

TONS PER SUMMER DAY

5noxmobct
Oct 18 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	=========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	6.161	0.702	0.380	0.435	0.074	0.008	1.678	0.030	9.468
2	BERKSHIRE	8.480	0.927	0.503	0.679	0.102	0.010	5.257	0.037	15.995
3	BRISTOL	19.102	1.941	1.054	1.179	0.227	0.020	7.812	0.070	31.405
4	DUKES	0.338	0.049	0.026	0.029	0.004	0.001	0.104	0.002	0.553
5	ESSEX	25.714	2.592	1.407	1.633	0.312	0.028	12.413	0.096	44.195
6	FRANKLIN	5.479	0.658	0.358	0.500	0.066	0.007	3.837	0.029	10.934
7	HAMPDEN	17.044	1.768	0.959	1.137	0.204	0.019	9.258	0.069	30.458
8	HAMPSHIRE	6.011	0.669	0.363	0.431	0.072	0.007	2.286	0.027	9.866
9	MIDDLESEX	51.904	5.188	2.817	3.174	0.628	0.056	23.836	0.193	87.796
10	NANTUCKET	0.136	0.024	0.013	0.015	0.002	0.000	0.050	0.001	0.241
11	NORFOLK	27.684	2.780	1.509	1.679	0.329	0.029	12.679	0.103	46.792
12	PLYMOUTH	15.257	1.567	0.851	1.023	0.184	0.017	6.998	0.060	25.957
13	SUFFOLK	11.623	1.117	0.606	0.717	0.138	0.012	4.421	0.040	18.674
14	WORCESTER	30.585	3.199	1.736	2.155	0.366	0.034	16.395	0.130	54.600
	STATE qc	225.518	23.181	12.582	14.786	2.708	0.248	107.024	0.887	386.934

TABLE I-10

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -CO
TONS PER SUMMER DAY

5coSmobct
Oct 19 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	==========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	52.808	5.929	3.314	3.289	0.046	0.005	0.650	0.575	66.616
2	BERKSHIRE	66.674	7.293	4.062	4.678	0.055	0.005	1.530	0.585	84.882
3	BRISTOL	154.047	15.901	8.852	8.083	0.120	0.011	2.324	1.032	190.370
4	DUKES	2.974	0.409	0.229	0.216	0.003	0.000	0.045	0.043	3.919
5	ESSEX	217.735	22.456	12.494	11.553	0.165	0.015	3.610	1.557	269.585
6	FRANKLIN	41.778	5.035	2.798	3.306	0.034	0.004	1.116	0.434	54.505
7	HAMPDEN	141.965	14.856	8.281	7.916	0.109	0.010	2.671	1.062	176.870
8	HAMPSHIRE	52.167	5.703	3.190	3.062	0.045	0.004	0.792	0.419	65.382
9	MIDDLESEX	423.184	43.615	24.251	22.076	0.320	0.028	6.774	2.968	523.216
10	NANTUCKET	1.305	0.219	0.123	0.129	0.001	0.000	0.023	0.029	1.829
11	NORFOLK	232.533	23.883	13.302	11.716	0.170	0.015	3.645	1.611	286.875
12	PLYMOUTH	125.418	12.958	7.214	7.121	0.097	0.009	2.054	0.956	155.827
13	SUFFOLK	95.330	9.039	5.006	5.061	0.081	0.007	1.469	0.595	116.588
14	WORCESTER	215.623	22.679	12.583	14.244	0.183	0.017	4.770	1.699	271.798
	STATE	1823.541	189.975	105.699	102.450	1.429	0.130	31.473	13.565	2268.262

TABLE I-11

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -CO

TONS PER WINTER DAY

6COWmobct
Oct 20 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	=========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	81.497	8.572	4.723	3.158	0.044	0.004	0.634	0.656	99.288
2	BERKSHIRE	103.094	10.551	5.804	4.489	0.052	0.005	1.490	0.667	126.152
3	BRISTOL	237.901	22.911	12.638	7.761	0.114	0.010	2.262	1.178	284.775
4	DUKES	4.591	0.592	0.327	0.207	0.003	0.000	0.043	0.049	5.812
5	ESSEX	335.751	32.392	17.817	11.093	0.157	0.014	3.517	1.773	402.514
6	FRANKLIN	64.762	7.304	4.006	3.176	0.032	0.003	1.088	0.496	80.867
7	HAMPDEN	219.073	21.479	11.819	7.601	0.104	0.010	2.601	1.211	263.898
8	HAMPSHIRE	80.725	8.269	4.558	2.990	0.043	0.004	0.773	0.481	97.843
9	MIDDLESEX	652.770	62.961	34.593	21.200	0.305	0.027	6.600	3.386	781.842
10	NANTUCKET	2.006	0.316	0.175	0.124	0.001	0.000	0.023	0.033	2.678
11	NORFOLK	358.589	34.496	18.977	11.250	0.162	0.014	3.552	1.839	428.879
12	PLYMOUTH	193.801	18.730	10.298	6.838	0.092	0.008	2.001	1.090	232.858
13	SUFFOLK	147.195	13.073	7.196	4.856	0.077	0.006	1.430	0.679	174.512
14	WORCESTER	334.424	32.882	18.011	13.679	0.174	0.016	4.645	1.939	405.770
	STATE qc	2816.179	274.528	150.942	98.422	1.360	0.121	30.659	15.477	3387.688 3387.688

TABLE I-12

NON-ROAD MOBILE SOURCE VOC EMISSIONS 1990 TPY AND TPSD BY COUNTY

NOV 7 93
4nroadvoc

	COUNTIES	AIRCRAFT TPSD	RAILROAD TPY	RAIL TPSD	COMMERC & MILIT VESSELS TPSD	EPA-OMS* NON-ROAD STUDY EM TPSD	TOTAL NON-ROAD EMISS VOC TPSD
	=========	=====	=====	=====	=====	=======	===========
1	BARNSTABLE	0.339	8.13	0.022	0.114	35.566	36.041
2	BERKSHIRE	0.000	18.07	0.049	0.000	8.166	8.215
3	BRISTOL	0.000	14.27	0.039	0.037	18.455	18.531
4	DUKES	0.191	0.00	0.000	0.000	4.078	4.269
5	ESSEX	0.234	19.87	0.054	0.006	30.363	30.657
6	FRANKLIN	0.000	17.52	0.048	0.000	7.080	7.128
7	HAMPDEN	0.322	19.33	0.053	0.000	19.642	20.017
8	HAMPSHIRE	0.000	8.85	0.024	0.000	7.569	7.593
9	MIDDLESEX	0.122	24.93	0.068	0.000	59.754	59.944
10	NANTUCKET	0.225	0.00	0.000	0.000	4.671	4.896
11	NORFOLK	0.054	18.07	0.049	0.004	27.497	27.604
12	PLYMOUTH	0.000	12.47	0.034	0.046	25.951	26.031
13	SUFFOLK	3.517	9.94	0.027	0.568	14.226	18.338
14	WORCESTER	0.033	38.66	0.106	0.000	28.727	28.871
	STATE	5.042	210.11	0.573	0.775	291.745	298.135 298.135

* TAKEN FROM EPA'S NON-ROAD ENGINE STUDY

TABLE I-13

(TABLE D.4-3)
NON-ROAD MOBILE SOURCE NOX EMISSIONS 1990 TPY AND TPSD BY COUNTY

NOV 7 93 4nroadnox COUNTIES	1 AICRFT TPSD	2 RAILROAD TPY	2 RAIL TPSD	3 COMMERC & MILIT VESSELS	4 * EPA-NON ROAD STUDY TPSD	TOTAL NONROAD EMISS NOX TPSD
==========	=====	=====	=====	=====	=======	========
1 BARNSTABLE	0.148	150.33	0.412	1.021	6.43	8.011
2 BERKSHIRE	0.000	334.07	0.915	0.000	3.66	4.575
3 BRISTOL	0.000	263.92	0.723	0.330	11.21	12.263
4 DUKES	0.080	0.00	0.000	0.000	0.96	1.040
5 ESSEX	0.045	367.48	1.007	0.046	14.57	15.668
6 FRANKLIN	0.000	324.05	0.888	0.000	1.91	2.798
7 HAMPDEN	0.234	357.46	0.979	0.000	7.72	8.933
8 HAMPSHIRE	0.000	163.70	0.448	0.000	3.15	3.598
9 MIDDLESEX	0.032	461.02	1.263	0.000	37.93	39.225
10 NANTUCKET	0.051	0.00	0.000	0.000	0.72	0.771
11 NORFOLK	0.008	334.07	0.915	0.031	16.32	17.274
12 PLYMOUTH	0.000	230.51	0.632	0.458	9.85	10.940
13 SUFFOLK	5.411	183.74	0.503	4.033	20.38	30.327
14 WORCESTER	0.020	714.91	1.959	0.000	18.78	20.759
STATE	6.029	3885.26	10.645	5.919	153.59	176.183
		3885.26	10.645	5.919	153.59	176.183

* TAKEN FROM EPA-OMS NON-ROAD STUDY

TABLE I-14

(TABLE D.4-4)

NON-ROAD MOBILE SOURCE CO EMISSIONS 1990 TONS PER YEAR, SUMMER AND WINTER DAY

NOV 7 93
4nroadco

	COUNTIES	1 AICRFT TPSD TPWD	2 RAILROAD TPY	2 RAIL TPSD& TPWD	3 COMMERC & MILIT VESSELS	4 * EPA NON-RD STUDY TPSD	4* EPA NON-RD STUDY TPWD	TOTAL NONROAD EMISS CO TPSD	TOTAL NONROAD EMISS CO TPWD
	=========	=====	=====	=====	=====	======	=======	========	========
1	BARNSTABLE	0.823	20.57	0.056	0.226	125.91	0.00	127.015	1.105
2	BERKSHIRE	0.000	45.71	0.125	0.000	33.42	0.00	33.545	0.125
3	BRISTOL	0.000	36.11	0.099	0.056	88.01	0.00	88.165	0.155
4	DUKES	1.073	0.00	0.000	0.000	13.39	0.00	14.463	1.073
5	ESSEX	0.841	50.28	0.138	0.006	143.23	0.00	144.215	0.985
6	FRANKLIN	0.000	44.34	0.121	0.000	23.98	0.00	24.101	0.121
7	HAMPDEN	1.007	48.91	0.134	0.000	90.53	9.02	91.671	10.161
8	HAMPSHIRE	0.000	22.40	0.061	0.000	28.84	0.00	28.901	0.061
9	MIDDLESEX	0.304	63.08	0.173	0.000	312.41	24.27	312.887	24.747
10	NANTUCKET	0.579	0.00	0.000	0.000	15.89	0.00	16.469	0.579
11	NORFOLK	0.398	45.71	0.125	0.006	138.23	6.32	138.759	6.849
12	PLYMOUTH	0.000	31.540	0.086	0.169	108.340	0.000	108.595	0.255
13	SUFFOLK	9.451	25.140	0.069	0.925	85.330	43.480	95.775	53.925
14	WORCESTER	0.188	97.820	0.268	0.000	129.660	8.760	130.116	9.216
	STATE	14.664	531.610	1.456	1.388	1337.170	91.850	1354.678	109.358

* TAKEN FROM EPA-OMS NON ROAD ENGINE STUDY

TABLE I-15

BIOGENIC VOC EMISSIONS 1990
USING EPA PC-BEIS MODEL

4biog90

	COUNTIES	TONS PER SUMMER DAY
1	BARNSTABLE	35.73
2	BERKSHIRE	95.78
3	BRISTOL	34.94
4	DUKES	9.22
5	ESSEX	31.45
6	FRANKLIN	73.78
7	HAMPDEN	58.87
8	HAMPSHIRE	48.79
9	MIDDLESEX	48.70
10	NANTUCKET	2.97
11	NORFOLK	24.68
12	PLYMOUTH	53.06
13	SUFFOLK	1.60
14	WORCESTER	131.67
	STATE	651.24

TABLE I-16

ALL SOURCE CATEGORIES VOC 1990 TONS PER YEAR AND SUMMER DAY BY COUNTY

NOV 8 93

4voccat90

	COUNTY	POINT TPY	POINT TPSD	ST.AREA TPY	ST.AREA TPSD	MOBILE5.a ON-ROAD TPSD	TOTAL NON-ROAD TPSD	BIOGENIC TPSD	TOTAL ANTHROPO- -GENIC VOC TPSD	TOTAL VOC WITH BIOGENIC TPSD
	=======	=====	======	=======	=======	=======	=======	======	=========	======
1	BARNSTABLE	172	0.551	4761.48	13.480	9.826	36.041	35.73	59.898	95.628
2	BERKSHIRE	333	1.067	3674.92	11.385	11.831	8.215	95.78	32.498	128.278
3	BRISTOL	2314	7.417	10419.04	30.452	25.452	18.531	34.94	81.852	116.792
4	DUKES	0	0.000	238.83	0.666	0.609	4.269	9.22	5.544	14.764
5	ESSEX	2105	6.747	17403.74	54.127	34.548	30.657	31.45	126.079	157.529
6	FRANLIN	97	0.311	1761.49	5.513	7.722	7.128	73.78	20.674	94.454
7	HAMPDEN	2448	7.846	9226.33	27.457	23.329	20.017	58.87	78.649	137.519
8	HAMPSHIRE	136	0.436	3155.00	9.339	9.570	7.593	48.79	26.938	75.728
9	MIDDLESEX	4129	13.234	33094.48	101.183	66.525	59.944	48.70	240.886	289.586
10	NANTUCKET	37	0.119	181.38	0.492	0.282	4.896	2.97	5.789	8.759
11	NORFOLK	1153	3.696	12638.98	37.041	36.113	27.604	24.68	104.454	129.134
12	PLYMOUTH	484	1.551	7938.64	23.179	20.670	26.031	53.06	71.431	124.491
13	SUFFOLK	1873	6.003	14185.96	40.060	16.555	18.338	1.60	80.956	82.556
14	WORCESTER	2298	7.365	15762.86	48.141	39.189	28.871	131.67	123.566	255.236
	STATE	17579	56.343	134443.13	402.515	302.221	298.135	651.24	1059.214	1710.454

TABLE I-17

ALL SOURCE CATEGORIES NOX 1990 TONS PER YEAR AND SUMMER DAY BY COUNTY

Nov 8 93
4noxcat90

	COUNTY	POINT TPY	POINT TPSD	ST.AREA TPY	ST.AREA TPSD	MOBILE5.a ON-ROAD TPSD	NON-ROAD TPSD	TOTAL NOX TPSD
1	BARNSTABLE	13982	44.814	838.75	1.009	9.468	8.011	63.302
2	BERKSHIRE	917	2.939	628.31	0.755	15.995	4.575	24.264
3	BRISTOL	40459	129.676	2278.28	2.747	31.405	12.263	176.091
4	DUKES	0	0.000	53.58	0.063	0.553	1.040	1.656
5	ESSEX	22354	71.647	3006.46	3.613	44.195	15.668	135.123
6	FRANLIN	423	1.356	315.51	0.378	10.934	2.798	15.466
7	HAMPDEN	6181	19.811	2054.16	2.473	30.458	8.933	61.675
8	HAMPSHIRE	1018	3.263	659.20	0.790	9.866	3.598	17.517
9	MIDDLESEX	2235	7.163	6256.18	7.508	87.796	39.225	141.692
10	NANTUCKET	1722	5.519	28.36	0.034	0.241	0.771	6.565
11	NORFOLK	654	2.096	2761.68	3.319	46.792	17.274	69.481
12	PLYMOUTH	143	0.458	1953.59	2.349	25.957	10.940	39.704
13	SUFFOLK	18686	59.891	2995.02	3.627	18.674	30.327	112.519
14	WORCESTER	3744	12.000	3180.66	3.823	54.600	20.759	91.182
	STATE	112518	360.635	27009.74	32.488	386.934	176.182	956.239

TABLE I-18

ALL SOURCE CATEGORIES CO 1990 TONS PER YEAR, SUMMER DAY & WINTER DAY BY COUNTY

Nov 8 93

4cocat90

COUNTY	STATIONARY POINT TPY	STATION POINT TPSD	STATION POINT TPWD	STATION. AREA TPY	STATION. AREA TPSD	STATION. AREA TPWD	MOBILE5.a ON-ROAD TPSD	MOBILE5.a ON-ROAD TPWD	NON-ROAD MOBILE TPSD	NON-ROAD MOBILE TPWD	TOTAL CO TPSD	TOTAL CO TPWD
1 BARNSTABLE	1555	4.984	4.984	4401.71	1.720	22.137	66.616	99.288	127.015	1.105	200.335	127.514
2 BERKSHIRE	277	0.888	0.888	3415.87	1.433	16.684	84.882	126.152	33.545	0.125	120.748	143.849
3 BRISTOL	1950	6.250	6.250	11961.97	5.025	60.542	190.370	284.775	88.165	0.155	289.810	351.722
4 DUKES	0	0.000	0.000	374.86	0.184	1.447	3.919	5.812	14.463	1.073	18.566	8.332
5 ESSEX	1315	4.215	4.215	15458.50	5.750	79.043	269.585	402.514	144.215	0.985	423.765	486.757
6 FRANLIN	28	0.090	0.090	1702.87	0.659	8.313	54.505	80.867	24.101	0.121	79.355	89.391
7 HAMPDEN	1155	3.702	3.702	10905.73	4.526	54.508	176.870	263.898	91.671	10.161	276.769	332.269
8 HAMPSHIRE	357	1.144	1.144	3544.01	1.309	17.298	65.362	97.843	28.901	0.061	96.736	116.346
9 MIDDLESEX	329	1.054	1.054	31241.95	10.363	163.130	523.216	781.842	312.887	24.747	847.520	970.773
10 NANTUCKET	184	0.590	0.590	239.56	0.148	0.801	1.828	2.678	16.469	0.579	19.035	4.648
11 NORFOLK	144	0.462	0.462	14046.09	5.093	72.474	286.875	428.879	138.759	6.849	431.189	508.664
12 PLYMOUTH	105	0.337	0.337	10054.83	3.817	51.451	155.827	232.858	108.595	0.255	268.576	284.901
13 SUFFOLK	2274	7.288	7.288	15864.54	7.569	80.644	116.588	174.512	95.775	53.925	227.220	316.369
14 WORCESTER	550	1.763	1.763	16112.94	5.839	83.476	271.798	405.770	130.116	9.216	409.516	500.225
STATE	10223	32.766	32.766	139325.43	53.435	711.948	2268.261	3387.688	1354.677	109.357	3709.139	4241.759
											3709.139	4241.759

TABLE I-19

CO 1990 EMISSIONS APPORTIONED FROM COUNTIES TO NON-ATTAINMENT CITIES AND TOWNS BY POPULATION AND VEHICLE REGISTRATION

Nov 8 93 TONS PER WINTER DAY
5towncow

COUNTIES	VEHIC* REG %	POP 1990	%	STAT POINT	STAT AREA	MOBILE5a ON-ROAD	NON-ROAD MOBILE	TOTAL CO TPWD
BARNSTABLE	3.8	186605	3.1%	4.98	22.14	99.29	1.11	127.51
BERKSHIRE	2.4	139352	2.3%	0.89	16.68	126.15	0.13	143.85
BRISTOL	8.7	506325	8.4%	6.25	60.54	284.78	0.16	351.72
DUKES	0.3	11639	0.2%	0.00	1.45	5.81	1.07	8.33
ESSEX	11.3	670080	11.1%	4.22	79.04	402.51	0.99	486.76
FRANKLIN	1.3	70092	1.2%	0.09	8.31	80.87	0.12	89.39
HAMPDEN	7.7	456310	7.6%	3.70	54.51	263.90	10.16	332.27
HAMPSHIRE	2.3	146568	2.4%	1.14	17.30	97.84	0.06	116.35
MIDDLESEX	23.5	1398468	23.2%	1.05	163.13	781.84	24.75	970.77
NANTUCKET	0.2	6012	0.1%	0.59	0.80	2.68	0.58	4.65
NORFOLK	10.5	616087	10.2%	0.46	72.47	428.88	6.85	508.66
PLYMOUTH	7.6	435276	7.2%	0.34	51.45	232.86	0.26	284.90
SUFFOLK	8.3	663906	11.0%	7.29	80.64	174.51	53.93	316.37
WORCESTER	12.1	709705	11.8%	1.76	83.48	405.77	9.22	500.23
STATE	100	6016425	100.0%	32.77	711.95	3387.69	109.36	4241.76
NON-ATTAINMENT CITY/TOWN								
1BOSTON SUFF	88.5	574283	86.5%	6.30	69.76	154.44	46.65	277.15
2REVERE SUFF	7.4	42786	6.4%	0.47	5.20	12.91	3.48	22.06
3CHELSEA SUF	4.1	28710	4.3%	0.32	3.49	7.15	2.33	13.29
4EVERETT MDX	2.2	35701	2.6%	0.03	4.16	17.20	0.63	22.02
5MALDEN MDX	3.3	53884	3.9%	0.04	6.29	25.80	0.95	33.08
6MEDFORD MDX	3.6	57407	4.1%	0.04	6.70	28.15	1.02	35.90
7SOMERVL MDX	1.7	76210	5.4%	0.06	8.89	13.29	1.35	23.59
8CAMBRID MDX	5.1	95802	6.9%	0.07	11.18	39.87	1.70	52.82
9QUINCY NORF	10.4	84985	13.8%	0.06	10.00	44.60	0.94	55.61
TOTAL BOSTON AREA		1049768		7.39	125.65	343.43	59.04	535.51
10WORCES WOR	21.9	169759	23.9%	0.42	19.97	88.86	2.20	111.46
11SPRING HMD	34.8	156983	34.4%	1.27	18.75	91.84	3.50	115.36
12LOWELL MDX	6.1	103439	7.4%	0.08	12.07	47.69	1.83	61.67
13WALTHM MDX	4.0	57878	4.1%	0.04	6.75	31.27	1.02	39.09
TOTAL NON-ATT		1537827		9.21	183.19	603.09	67.60	863.09

* SOURCE: RJ POLK REGISTRATION COUNTS FOR CARS & TRUCKS 1990 -MASS

TABLE I-20

NOV 8 93
6vocNAA90

ALL SOURCE CATEGORIES VOC 1990 TONS PER YEAR AND SUMMER DAY BY NON-ATTAINMENT AREAS

COUNTY	POINT TPY	POINT TPSD	ST.AREA TPY	ST.AREA TPSD	MOBILE5.a ON-ROAD TPSD	TOTAL NON-ROAD TPSD	BIOGENIC TPSD	TOTAL ANTHROPO--GENIC VOC TPSD	TOTAL VOC WITH BIOGENIC TPSD
BOSTON NON-ATTAINMENT AREA									
1 BARNSTABLE	172	0.551	4761.48	13.480	9.826	36.041	35.73	59.898	95.628
3 BRISTOL	2314	7.417	10419.04	30.452	25.452	18.531	34.94	81.852	116.792
4 DUKES	0	0.000	238.83	0.666	0.609	4.269	9.22	5.544	14.764
5 ESSEX	2105	6.747	17403.74	54.127	34.548	30.657	31.45	126.079	157.529
9 MIDDLESEX	4129	13.234	33094.48	101.183	66.525	59.944	48.70	240.886	289.586
10 NANTUCKET	37	0.119	181.38	0.492	0.282	4.896	2.97	5.789	8.759
11 NORFOLK	1153	3.696	12638.98	37.041	36.113	27.604	24.68	104.454	129.134
12 PLYMOUTH	484	1.551	7938.64	23.179	20.670	26.031	53.06	71.431	124.491
13 SUFFOLK	1873	6.003	14185.96	40.060	16.555	18.338	1.60	80.956	82.556
14 WORCESTER	2298	7.365	15762.86	48.141	39.189	28.871	131.67	123.566	255.236
BOSTON N.A.	14565	46.682	116625.39	348.821	249.769	255.182	374.02	900.455	1274.475
SPRINGFIELD NON-ATTAINMENT AREA									
2 BERKSHIRE	333	1.067	3674.92	11.385	11.831	8.215	95.78	32.498	128.278
6 FRANLIN	97	0.311	1761.49	5.513	7.722	7.128	73.78	20.674	94.454
7 HAMPDEN	2448	7.846	9226.33	27.457	23.329	20.017	58.87	78.649	137.519
8 HAMPSHIRE	136	0.436	3155.00	9.339	9.570	7.593	48.79	26.938	75.728
SPRINGFLD NA	3014	9.6602	17817.74	53.694	52.452	42.953	277.22	158.759	435.979
STATE	17579	56.342	134443.13	402.515	302.221	298.135	651.24	1059.214	1710.454

TABLE I-21

ALL SOURCE CATEGORIES NOX 1990 TONS PER YEAR AND SUMMER DAY BY NON-ATTAINMENT AREA

noxNAA90b6
Nov 8 93

COUNTY	POINT TPY	POINT TPSD	ST.AREA TPY	ST.AREA TPSD	MOBILE5.a ON-ROAD TPSD	NON-ROAD TPSD	TOTAL NOX TPSD
BOSTON NON-ATTAINMENT AREA							
1 BARNSTABLE	13982	44.814	838.75	1.009	9.468	8.011	63.302
3 BRISTOL	40459	129.676	2278.28	2.747	31.405	12.263	176.091
4 DUKES	0	0.000	53.58	0.063	0.553	1.040	1.656
5 ESSEX	22354	71.647	3006.46	3.613	44.195	15.668	135.123
9 MIDDLESEX	2235	7.163	6256.18	7.508	87.796	39.225	141.692
10 NANTUCKET	1722	5.519	28.36	0.034	0.241	0.771	6.565
11 NORFOLK	654	2.096	2761.68	3.319	46.792	17.274	69.481
12 PLYMOUTH	143	0.458	1953.59	2.349	25.957	10.940	39.704
13 SUFFOLK	18686	59.891	2995.02	3.627	18.674	30.327	112.519
14 WORCESTER	3744	12.000	3180.66	3.823	54.600	20.759	91.182
BOSTON N.A.	103979	333.266	23352.56	28.092	319.681	156.278	837.317
SPRINGFIELD NA							
2 BERKSHIRE	917	2.939	628.31	0.755	15.995	4.575	24.264
6 FRANLIN	423	1.356	315.51	0.378	10.934	2.798	15.466
7 HAMPDEN	6181	19.811	2054.16	2.473	30.458	8.933	61.675
8 HAMPSHIRE	1018	3.263	659.20	0.790	9.866	3.598	17.517
SPRINGFIELD NA	8539	27.369	3657.18	4.396	67.253	19.904	118.922
STATE	112518	360.634	27009.74	32.488	386.934	176.182	956.239

TABLE I-22

ALL SOURCE CATEGORIES CO 1990 TONS PER YEAR, SUMMER DAY & WINTER DAY BY NON-ATTAINMENT AREAS

coNAA90b6

Nov 8 93 COUNTY	STATIONARY POINT TPY	STATION POINT TPSD	STATION POINT TPWD	STATION. AREA TPY	STATION. AREA TPSD	STATION. AREA TPWD	MOBILE5.a ON-ROAD TPSD	MOBILE5.a ON-ROAD TPWD	NON-ROAD MOBILE TPSD	NON-ROAD MOBILE TPWD	TOTAL CO TPSD	TOTAL CO TPWD
BOSTON NON-ATTAINMENT AREA												
1 BARNSTABLE	1555	4.984	4.984	4401.71	1.720	22.137	66.616	99.288	127.015	1.105	200.335	127.514
3 BRISTOL	1950	6.250	6.250	11961.97	5.025	60.542	190.370	284.775	88.165	0.155	289.810	351.722
4 DUKES	0	0.000	0.000	374.86	0.184	1.447	3.919	5.812	14.463	1.073	18.566	8.332
5 ESSEX	1315	4.215	4.215	15458.50	5.750	79.043	269.585	402.514	144.215	0.985	423.765	486.757
9 MIDDLESEX	329	1.054	1.054	31241.95	10.363	163.130	523.216	781.842	312.887	24.747	847.520	970.773
10 NANTUCKET	184	0.590	0.590	239.56	0.148	0.801	1.828	2.678	16.459	0.579	19.035	4.648
11 NORFOLK	144	0.462	0.462	14046.09	5.093	72.474	286.875	428.879	138.759	6.849	431.189	508.664
12 PLYMOUTH	105	0.337	0.337	10054.83	3.817	51.451	155.827	232.858	108.595	0.255	268.576	284.901
13 SUFFOLK	2274	7.288	7.288	15864.54	7.569	80.644	116.588	174.512	95.775	53.925	227.220	316.369
14 WORCESTER	550	1.763	1.763	16112.94	5.839	83.476	271.798	405.770	130.116	9.216	409.516	500.225
BOSTON N.A.	8406	26.942	26.942	119756.95	45.508	615.145	1886.622	2818.928	1176.459	98.889	3135.531	3559.904
SPRINGFIELD NON-ATTAINMENT AREA												
2 BERKSHIRE	277	0.888	0.888	3415.87	1.433	16.684	84.882	126.152	32.545	0.125	120.748	143.849
6 FRANLIN	28	0.090	0.090	1702.87	0.659	8.313	54.505	80.867	24.101	0.121	79.355	89.391
7 HAMPDEN	1155	3.702	3.702	10905.73	4.526	54.508	176.870	263.898	91.671	10.161	276.769	332.269
8 HAMPSHIRE	357	1.144	1.144	3544.01	1.309	17.298	65.382	97.843	28.901	0.061	96.736	116.346
SPRINGFIELD N	1817	5.824	5.824	19568.48	7.927	96.803	381.639	568.760	178.218	10.468	573.608	681.855
STATE	10223	32.766	32.766	139325.43	53.435	711.948	2268.201	3387.688	1354.677	109.357	3709.139	4241.759

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SECTION A

STATIONARY POINT SOURCES

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SECTION A

STATIONARY POINT SOURCES

1.1 INTRODUCTION

The Massachusetts Department of Environmental Protection - Division of Air Quality was the lead agency responsible for compiling the point source inventory. It was responsible for identifying point sources meeting the cutoff criteria, documenting the method used to calculate emissions from each source and summarizing and presenting its findings.

Many EPA inventories in the past defined stationary point sources as facilities which emit 100 tons per year (TPY) or more of a given pollutant. For the purpose of this emission inventory, point sources will be defined as stationary, commercial or industrial operations that emit more than 10 TPY of VOC's or 50 TPY of NOx or 100 tons TPY of CO. The point source inventory consists of actual emissions for the base year 1990 in Massachusetts and does not include 100 ton VOC sources located within 25 mile radius outside the boundaries of the state at the request of EPA in a letter dated April 8, 1992.[9]

The following sections will document the development of the Massachusetts stationary point source and serve to characterize the point source component of the emission inventory by describing data collection, verification and emission estimation techniques.

1.2 COMPILING THE STATIONARY POINT SOURCE LIST

Point source data collection is initiated each year by the Massachusetts Regulation 310 CMR 7.12 Inspection certificate, Record Keeping and Reporting. Registration forms (Appendix A-1) are mailed annually for any major stationary source above 100 TPY and once every three years for all other facilities. The forms are returned to DEP Regional offices and a source inspection is conducted by the inspectoral staff who would then enter the source information (General,Process Activity) into the Massachusetts computer system called Station Source Enforcement Inventory System (SSEIS). Registration forms are tracked through the SSEIS system and forms not returned within the specific time period are sent a "non" for non compliance. If the non is ignored a driveby is initiated to see if the source exists and appropriate action will be taken. These data verification techniques ensured a complete data set for each point source in the inventory. This existing inventory was used to begin the initial screening of sources for this report.

To supplement the existing stationary point source list we reviewed construction and modification permits for DEP in order to adequately account for sources that were only recently (1990) began operation. DEP-Divisions were contacted for computer listing for cross referencing with SSEIS. Business Directories, Local Telephone Directories, Industrial Directories[7] and the Toxic

Release Inventory System (TRIS) database categories listed in Table 2.2-1 of the EPA Procedures Document[4] were consulted.

The comprehensive initial list was refined by eliminating facilities that were known to have closed and those that were found to have no local emission activities (e.g., Sales Offices,Corporate Headquarters). Each of the stationary point sources on the initial list were inspected or contacted by the source registration process in order to determine if the emission activity exceeded the 10 TPY threshold for VOC, or the 50 TPY level for NOx and 100 TPY for CO. Sources with annual emissions less than these cut-offs were eliminated from the stationary point source list and will be accounted for in the Area Source Inventory.

Table A-1 shows the final stationary point source list and includes the name, county, and pollutants emitted for each identified source. Final county emissions are presented in Table A-1 in tons per year and summer day.

1.3 POLLUTANTS TO BE INVENTORIED

The pollutants of interest for the 1990 base year stationary source inventories under the Clean Air Act remain unchanged from those examined from previous EPA inventories. The inventory will contain a summary of emission estimates for VOC, CO and NOx. Non-reactive VOC compounds are excluded from the inventory because control of emissions of nonreactive compounds will neither contribute to the attainment and maintenance of the NAAQS for ozone nor be credited toward attainment of that standard. These compounds include the following:

methane
ethane
methylene chloride
methyl chloroform (1,1,1-trichloroethane)
(CFC-11) trichlorofluoromethane
(CFC-12) dichlorodifluoromethane
(CFC-22) chlorodifluoromethane
(CFC-23) trifluoromethane
(CFC-113) trichlorotrifluoroethane
(CFC-114) dichlorotetrafluoroethane
(CFC-115) chloropentafluoroethane
(HCFC-123) 2,2-dichloro-1,1,1-trifluoroethane (306-83-2)
(HCFC-124) 2-chloro-1,1,1,2-tetrafluoroethane (2837-89-0)
(HFC-125) pentafluoroethane (354-33-6)
(HFC-134) 1,1,2,2-tetrafluoroethane (359-35-3)
(HFC-134a) 1,1,1,2-tetrafluoroethane (811-97-2)
(HCFC-141b) 1,1-dichloro-1-fluoroethane (1717-00-6)
(HCFC-142b) 1-chloro-1,1-difluoroethane (65-68-3)
(HFC143a) 1,1,1-trifluoroethane (420-46-2)
(HFC152a) 1,1-difluoroethane (75-37-6)

The following four classes of perfluorocarbon (PFC):

1) cyclic, branched, or linear, completely fluorinated alkanes.
2) cyclic, branched, or linear, completely fluorinated ethers with no unsaturations.
3) cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations.
4) sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.

1.4 APPLICABLE STATIONARY POINT SOURCE CATEGORIES

The 1990 Base Year inventory addresses the stationary point sources categories outlined in the EPA guidance document[4] (EPA 450/4-9-101). A copy of the stationary source categories is provided in Appendix A-3.

1.5 EMISSION ESTIMATION PROCEDURES

Emissions from stationary point sources were calculated using EPA recommended emission factors as published in Compilation of Air Pollutants Emission Factors-supplemental D[1] and the Airs Facility Subsystem SCC and Emission Factors listing of March 1990.[8]

In the majority of the cases these references were used to calculate emissions for boilers, incinerators and many process sources. Some emissions were calculated using a materials balance approach and stack sampling results. The operating schedule for the plant, the seasonal rate of operation for the summer and days per week was used by the SAMS program to determine the daily emission rates. The EPA national default rule effectiveness of 80% was applied to points in the inventory that are subject to Massachusetts regulations. The following examples will show how emission estimates were obtained for the poi sources on the list:

EXAMPLE #1

Commonwealth Electric Company ID#119-0002
46 Blackstone Street
Cambridge, MA 01239

GENERAL FACILITY INFORMATION

Commonwealth Electric Co. operates a steam and electric generating facility with four (4) oil-gas fired boilers. The plant continuously operates at maxium generating capacity, so no seasonal or weekday adjustment were applied.

Calculations

Boiler #1 (Point 1)
Fuel #6 oil @ 5% S and @ 0.1% Ash
605,000 gal./yr.
SCC 10100401

Emission Factors

TSP=9.6 lbs/1000 gals X % A = 9.6 X .001=.01 lbs/1000 gals/yr.

SO2=159.3 lbs/1000 X % S = 159.3 X .05=7.96 lbs/1000 gals/yr.

NO2= 67 lbs/1000 gals.

CO = 5 lbs/1000 gals.

VOC = 0.76 lbs/1000 gals.

Emissions

TSP=605 X .01 lbs/1000 gals/yr X (1-0.95) X 1/2000 lbs/ton=0.003T/yr

SO2=605 X 7.96 lbs/1000 gals/yr X (1-0) X 1/2000 lbs/ton =2.4 T/yr

NO2=605 X 67 lbs/1000 gals/yr X (1-0) X 1/2000 lbs/ton =20 T/yr

CO= 605 X 5.0 lbs/1000 gals/yr X (1-0) X 1/2000 lbs/ton = 2 T/yr

VOC=605 X 0.76 lbs/1000 gals/yr X (1-0) X 1/2000 lbs/ton =.22T/yr

Ozone Season and CO Season Daily Rate

NO2 = 40,535 lbs/yr X 1/8760 yr/hrs X 24 hrs/03 day = 111 lbs/Day

VOC = 459.8 lbs/yr X 1/8760 yr/hrs X 24 hrs/03 day = .13 lbs/Day

CO = 3,025 lbs/yr X 1/8760 yr/hrs X 24 hrs/03 day = 8.3 lbs/Day

EXAMPLE #2

Mass Balance Determination

A. Isopropyl Alcohol

1. 600 gal/yr of isopropyl alcohol is used
Specific Gravity = 0.789
Density= .789 X 8.233 lb/gal = 6.57 lb/gal

2. 600 gal/yr X 6.57 lb/gal = 3,943 lbs/yr X 1/2000 lbs/T
= 1.97 T/Yr. VOC

B. Paint

1. 100 gallons of black paint was used in a year.
   MSDS Sheet: Density = 7.5 lbs/gal and 70 % VOC by weight

2. 100 gal/yr X 7.5 lb/gal=750 lb/yr X 0,70/=525 lbs/yr VOC

C. Adhesive

1. 150 gals of adhesive is applied on a coating line.
   A dryer is attached to the coater to cure the adhesive and it is vented to an afterburner for control
   Specific Gravity = 0.80
   % VOC by Weight = 50%
   Density = 0.80 X 8.33 Lbs/gal = 6.66 lb/gal.
   Incinerator Efficiency = 95%

2. 150 gal/yr X 6.66 lbs/gal X 0.50 = 499.8 lbs/yr of VOC

3. VOC Destroyed by Incinerator
   Total VOC used X % Captured X Incinerator Efficiency
   499.8 lbs/VOC X 0.80 X 0.95 = 379.8 lbs/VOC Destroyed

4. VOC Emitted
   Total - Destroyed - VOC
   499.8 lbs/yr = 379.8 lbs/VOC = 119.9 lbs/VOC

EXAMPLE #3

Barnet Corp. ID # 119-1824
58 Pulaski Road
Peabody, MA 01960

General Facility Information

The Barnet Corp. operates a leather tanning and finishing operations. The facility has a number of spraybooths that used lacquers and thinners in its operation.

Calculations

Spray Booth #1 (Point #2, Segment #2)
Shift: 12 hr/day - 6/day/wk - 50 wk/yr.
SCC: 40200401 - Lacquer
Emission Factor: 1540 lbs/ton

Emissions

VOC: 37 T/yr X 1540 lbs/T X 1/2000 lbs/T = 28.49 T/yr.

Ozone Season Daily Rate

VOC: (28 T/yr X 2000 lbs/T) X (.25) = 179 lb/Day
(6 Day/Wk X 13 Wks)

EXAMPLE #4

Lee Products ID # 119-1668
380 Second Street
Everett, MA 02149

General Facility Information

The Lee Products manufactures electrical enclosures such as conduit boxes or wire conduits. The sources has a spray booth and a vapor degreaser on site.

Calculations

Vapor Degreaser (Point #2, Segment #2)
Shift: 8 hr/day, 5 day/wk, 52 wks/yr.
SCC: 40100202 - Open Top Degreaser 1,1,1 Trichloroethane
Specific Gravity: 1.325
Density = 10.89 lbs/gal.

Emission

VOC: 2,446 gal/yr X 10.89 lbs/gal X 1/2000 lbs/ton = 13.3 T/yr.

(13.3 T/Yr. X 2000 lbs/Ton) X (.25)
5 Days/Wk X 13 Wks/Season = 102 lbs/Day

1.6 EMISSION TABLES

Total Annual VOC, NOx and CO emissions from Stationary Point Sources for counties in Massachusetts is shown in Table A-1.

1.7 AIRS/AFS STATIONARY POINT SOURCE SUBMITTAL

EPA's SAMS program was used to compile the stationary point source inventory and prepare the data for SIP submittal. The "AFS EDIT CHECK" subroutine was run to discover any problems, and these were corrected. The "Create AFS Transactions" was created using the directions in the

SAM'S Manual. The discs containing the AFS Transactions were delivered to the EPA Region 1 Office.

1.8 REQUIRED INFORMATION FOR STATIONARY POINT SOURCES

A SAMS detailed Stationary Point Source information report containing all the required data for a single point source is shown in Appendix A.4. A list of the required data is shown in Chapter 4 of the EPA Requirements Document (EPA-450/4-91-010).[3]

TABLE A-1

SAMS   Report Date: 10/29/93
Report Time: 13:40:11

PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
TONS/YEAR

PLANT NAME	VOC	NOx	CO	SO2	PM10	TSP
SEMASS	11	1945	647	525	0	163
CANAL ELECTRIC CO	136	11999	895	62747	0	256
MASS AIR NATIONAL GUARD BASE	25	38	13	45	0	6
Total for Barnstable Co	172	13982	1555	63317	0	425
JAMES RIVER-CURTIS	0	34	4	218	0	16
VICON RECOVERY ASSOC.	0	112	6	80	0	28
ALTRESCO - PITTSFIELD	19	104	118	46	0	19
RISING PAPER CO	0	42	4	265	0	20
MEAD CORP.	0	35	3	224	0	17
MEAD CORP.	0	29	3	179	0	13
KIMBERLY CLARK CORP.	0	118	9	399	0	30
GENERAL ELECTRIC COMPANY	23	111	11	468	0	36
WILLIAMS COLLEGE	0	26	2	167	0	13
CRANE & CO-B.W.MILL	0	27	3	120	0	9
CRANE & CO	8	32	4	153	0	12
PFIZER, INC.	23	234	110	101	0	119
SPRAGUE ELECTRIC CO.	21	0	0	0	0	0
W.R.GRACE & CO	134	11	0	38	0	3
A.H.RICE CO.,INC	60	1	0	0	0	0
COMMONWEALTH SPRAGUE	45	1	0	3	0	0
Total for Berkshire Co	333	917	277	2461	0	335
IBC CORP	16	0	0	0	0	0
TEXAS INSTRUMENTS	9	77	8	303	0	30
ARKWRIGHT FINISH DIVISION	8	41	4	224	0	17
DURO FINISHING CORP	35	16	3	34	0	2
REFLEX CORP.	12	0	0	0	0	4
AEROVOX INDUSTRIES	146	14	1	35	0	3
ACUSHNET CO.-PLANT A	95	16	2	40	0	4
GOODYEAR TIRE & RUBBER	15	16	2	35	0	2
CANNON ST.STATION	1	219	19	325	0	1
LOW-TEMP ENGINEERING	26	1	0	0	0	0
MONTAUP ELECTRIC CO	15	3007	128	11512	0	56
NEW ENGLAND POWER CO	143	35986	1118	83706	0	431
HARODITE FINISH CO.	19	5	1	10	0	1
TAUNTON MUN LIGHT PL	12	690	79	1038	0	88
RAND MCNALLY - TAUNTON	10	0	0	3	0	5
CHEMET CORP.	8	0	0	0	0	32
STERN/LEACH COMPANY	26	0	0	0	0	0
POLAROID CORPORATION	68	14	1	39	0	4
SWANK,INC	63	4	0	12	0	1

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SAMS      Report Date: 10/29/93                 PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
Report Time: 13:40:11                                               TONS/YEAR

PLANT NAME                                   VOC        NOx        CO        SO2       PM10       TSP
-------------------------------------------- --------   --------   --------  --------  --------   --------
TEKNOR APEX CO.                                 12         24          3        71         0          7
ACUSHNET CO.-PLANT B                            32         11          2        24         0          2
GOLD MEDAL BAKERY INC.                         157          0          0         0         0          0
GLOBE MANUFACTURING                            248         20          4         9         0          0
CHAMBERLAIN MFG.                                33         10          2         2         0          2
COATERS INC                                     15          3          0         6         0          0
CORNELL DUBILIER CO                             42         14          2        38         0          2
POLAROID CORPORATION                            27         76          6       183         0          2
PCI GP. INC.J.C.RHOD                            42          1          0         2         0          0
TELEDYNE RODNEY METALS                          20          8          1         0         0          0
U.S. RING BINDER CORP.                          28          1          0         0         0          0
CAPE DORY YACHTS                                25          0          0         2         0          0
PAUL DEVER STATE SCHOOL                          0         36          3        99         0          9
SHELL OIL COMPANY                              128          0          0         0         0          0
ATTLEBORO WOOD WORKS INC                        16          0          0         0         0          3
AUTOMATIC MACH.PRDS.                            32          0          0         2         0          0
LARSON TOOL&STAMP CO                             6          0          0         0         0          0
DURO TEXTILE PRINTER                            26          8          0        11         0          3
FALL RIVER DPW INCINERATOR                       3         56        557        70         0         41
ROMA COLOR INC.                                 14          0          0         0         0          0
BRITTANY DYE & PRINT                           191         10          0        24         0          2
COYNE TEXTILE SERVICES                          18          4          0        10         0          1
DARTMOUTH FINISHING                             37         14          0        30         0          2
R.E. SMITH PRINTING                             12          0          0         0         0          0
STURDY LANTERN MFG.                             14          0          0         0         0          0
EUREKA MFG. CO.,INC.                            43          0          0         0         0          1
HASKON CORP.                                    19         12          1        33         0          6
SILVER CITY ALUMINUM                             9          0          0         0         0          0
TAUNTON SILVERSMITHS                            19          0          0         0         0          0
ASHWORTH BROS. INC.                             44          1          0         4         0          0
BEE FIBERGLASS INC.                             24          0          0         0         0          0
STORETECH INC                                   10          1          0         5         0          0
SWAN FINISHING CO.IN                            66         43          3        60         0          6
INTERNATIONAL DRYER CORP.                        9          0          0         0         0          0
POLYMERINE LTD.                                 19          0          0         0         0          0
KILBURN GLASS INC.                              11          0          0         0         0          0
NORWELL MANUF.CO.                               12          0          0         0         0          0
TEXAS INSTRUMENTS                              124          0          0         0         0          1
------------------------------------------------------------------------------------------------------------
Total for Bristol Co                          2314      40459       1950     98001         0        821
------------------------------------------------------------------------------------------------------------

ROYAL TAPE INC.                                 70          0          0         0         0          0
GENERAL ELECTRIC CO                             16        887         83      1415         0        112
PHILIP LIGHTING CO                              94          5          0         4         0          0
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PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
TONS/YEAR

PLANT NAME	VOC	NOx	CO	SO2	PM10	TSP
BOSTIK INC.	32	18	1	52	0	5
SALEM SUEDE	14	0	0	0	0	0
EASTMAN GELATIN CORP	0	166	16	311	0	24
REX FINISHING INC.	82	0	0	3	0	0
NEW ENGLAND POWER	85	16855	626	45343	0	135
MORTON INTERNATIONAL INC	14	26	2	75	0	6
NEW ENGLAND POWER CO	11	119	26	50	0	11
EMHART INDUSTRIES	0	14	1	84	0	5
U.S.PLASTICS CORP.	52	0	0	0	0	0
GTE PRODUCTS CORP	35	6	0	14	0	0
RICHARD TANNING CO.	19	1	0	2	0	0
SALEM SUEDE INC.	29	6	0	20	0	2
CONSOLIDATED COLOR CORP	12	0	0	0	0	0
SUPATCO	42	0	0	0	0	0
STAHL FINISH	37	5	0	14	0	3
BARNET CORP.	190	0	0	0	0	0
OMEGA PLASTICS	59	0	0	0	0	0
LEPAGES INC	131	1	0	0	0	0
PARKER BROS.	39	2	0	3	0	0
WHEELABRATOR - SAUGUS	16	568	348	268	0	150
IDEAL FINISHING CO.	16	0	0	0	0	0
PHILLIPS ACADEMY	0	40	4	70	0	6
OGDEN MARTIN MA-BURN	28	1277	32	275	0	45
HAVERHILL PAPERBOARD	11	316	24	586	0	45
OGDEN MARTIN SYSTEMS-LAWRENCE TCF	0	564	72	190	0	14
MERRIMAC PAPER CO.	0	45	4	129	0	10
JAYBIRD & MAIS INC.	32	0	0	0	0	0
HERO COATINGS INC	12	0	0	0	0	0
A. T. & T.	95	60	4	180	0	12
R&C MANUFACTURING CO	61	1	0	2	0	0
GILLETTE CO. THE	40	9	9	23	0	9
PARLEX CORPORATION	10	0	0	0	0	0
FOILMARK INC	68	1	0	0	0	0
COUNTRY RIVER FURNITURE	16	0	0	0	0	0
CROWN CORK & SEAL	234	1	0	0	0	0
VERNON PLASTICS CO	45	7	0	22	0	1
EASTERN PACKAGING CO.	17	0	0	0	0	0
NEWARK ATL PAPER CORP.	0	202	16	212	0	13
PLYCRAFT INC.	13	0	0	5	0	0
TEXTRON SPECIALTY	5	140	12	0	0	0
TEK COATING CO.,INC	13	0	0	0	0	0
STARENSIER INC.	185	0	0	0	0	0
TOWLE MANUFACTURING	11	0	1	3	0	0
NEW ENGLAND POWER CO.	4	44	8	4	0	4
WHEELABRATOR-NANDOVER	0	956	26	672	0	30

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PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
TONS/YEAR

PLANT NAME	VOC	NOx	CO	SO2	PM10	TSP
NEW BALANCE ATHLETIC	10	2	0	0	0	0
BME ENGINEERING INC	14	0	0	0	0	0
CRAIG SYSTEMS INC.	27	0	0	0	0	0
FRANK C. MEYER CO.	21	0	0	0	0	2
RAYTHEON CO	38	10	0	31	0	0
Total for Essex Co	2105	22354	1315	50062	0	644
STRATHMORE PAPER CO.	0	34	4	100	0	8
INDECK ENERGY SERV.	1	243	11	119	0	6
ERVING PAPER MILLS	23	75	7	224	0	17
FLORENCE CASKET CO.	34	0	0	0	0	0
STANHOME INC.	16	0	0	0	0	0
NATIONAL FELT CO.	11	15	2	72	0	6
AMERICAN FIBER & FIN	0	53	4	340	0	27
WATERCRAFT INC	12	0	0	0	0	0
Total for Franklin Co	97	423	28	855	0	64
UNIVERSITY OF MASSACHUSETTS-AMHERST	17	194	162	421	0	8
SPFLD RESOURCE RECOVERY	85	163	24	33	0	0
SPALDING SPORTS WORLD	85	13	4	0	0	0
HOLYOKE GAS & ELECTRIC - NORTHEAST UTIL.	2	261	19	238	0	21
HOLYOKE WATER POWER - MT.TOM	15	4409	126	12282	0	94
ZERO CORPORATION	23	2	0	13	0	1
CASCADES DIAMOND INC.	6	25	6	99	0	4
WESTFIELD RIVER PAPER	0	55	5	339	0	25
JAHN FOUNDRY	2	0	554	3	0	2
MONSANTO CHEMICAL COMPANY	306	270	155	884	0	3
SMITH & WESSON	17	10	0	16	0	2
TITEFLEX CORPORATION	44	1	0	3	0	0
COLUMBIA MFG CO	65	1	0	3	0	0
J.S.LANE & SON INC.	0	7	2	1	0	111
WESTERN MASS.-NORTHEAST UTILITIES	8	622	81	1230	0	35
STRATHMORE PAPER COMPANY	0	86	8	251	0	19
HODGE MANUF. CO. INC	25	0	0	0	0	0
HAZEN PAPER COMPANY	51	1	0	0	0	0
SPRINGFIELD WIRE INC.	23	1	0	0	0	0
EASTERN ETCHING & MFG	37	0	0	0	0	0
PLASTIC PACKAGING CO.	43	0	0	0	0	0
SULLIVAN PAPER CO.	7	0	0	1	0	0
DIGITAL EQUIP CORP	20	0	0	1	0	0
DECORATIVE SPECALITES CORP	80	8	2	2	0	0

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PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
TONS/YEAR

PLANT NAME	VOC	NOx	CO	SO2	PM10	TSP
HAMPDEN PAPERS INC.	39	0	0	0	0	0
MORTON INTERNL.INC.	13	0	0	0	0	0
GRAPHICS TECH INTERNATIONAL	838	45	7	85	0	8
MOBIL OIL CORP.	61	0	0	0	0	0
CHEMI-GRAPHICS INC.	11	0	0	0	0	0
MILTON BRADLEY CO.	39	0	0	10	0	0
SONOCO PRODUCTS CO.	23	2	0	0	0	0
AMERICAN SAW&MFG.CO.	40	1	0	1	0	0
ANDERSON + SONS INC.	41	0	0	0	0	0
LUDLOW TEXTILES CO.	28	0	0	0	0	0
MCKINSTRY METAL WORK	19	0	0	0	0	0
MILTON BRADLEY CO.	11	0	0	0	0	0
NATL.METAL INDUSTRIES	40	2	0	1	0	0
PACKAGE PRINTING CO.	192	0	0	0	0	0
STATE LINE POTATO CHIPS	13	2	0	0	0	0
MESTEK INC.	20	0	0	0	0	0
WESTVACO U.S.ENVELOPE	40	0	0	0	0	0
LUDLOW TECH. PRODUCTS	19	0	0	0	0	0
Total for Hampden Co	2448	6181	1155	15917	0	333
MASS. WHOLESALE ELECTRIC	51	926	348	159	0	22
AMHERST COLLEGE	0	17	3	80	0	6
SMITH COLLEGE	0	29	4	133	0	10
WARE COGEN LTD PTSP	0	46	2	150	0	2
ANITEC PRINTING PLAT.	15	0	0	0	0	0
SOUTHWORTH COMPANY	14	0	0	3	0	0
AVERY DENNISON	12	0	0	0	0	0
OCTOBER CO., THE INC.	44	0	0	0	0	0
Total for Hampshire Co	136	1018	357	525	0	40
ICI RESINS US	20	4	0	2	0	0
COMMONWEALTH ELECTRIC CO	0	154	12	132	0	6
COMMONWEALTH ELECTRIC COMPANY	4	725	54	313	0	28
MONSANTO CHEMICAL CO.	5	74	18	16	0	31
DENNISON MFG. CO.	339	22	1	43	0	4
SUPERIOR PROCESS CO.	24	0	0	0	0	0
NEW ENG.MEM.HOSPITAL	8	130	28	22	4	5
WALTER FERNALD SCHOOL	0	50	5	70	0	5
ODELL COMPANY,THE	60	1	0	3	0	0
KRAFT GENERAL FOODS	0	24	10	242	0	16
NATICK PAPERBOARD CORP	0	54	5	243	0	25

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SAMS      Report Date: 10/29/93                 PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
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PLANT NAME                                     VOC        NOx         CO        SO2       PM10        TSP
---------------------------------------- --------   --------   --------   --------   --------   --------
SHELL OIL CO.                                 263          0          0          0          0          0
CL HAUTHAWAY + SONS                             0          0          0          0          0          0
STERLIN CLARK LURTON                           63          0          0          1          0          1
SURFACE COATINGS INC                           31          5          0         11          0          1
W.R.GRACE & CO.                               230         15          1         43          0          4
HUB FABRIC LEATHER                             81          0          0          0          0          0
BRANDEIS UNIVERSITY                             1         50          5         71          0          5
HAARTZ AUTO FABRIC                             12          4          0          0          0          0
DANIELS PRINTING CO.                           85          0          0          0          0          0
IVEX CORPORATION                               77          8          1          8          0          1
GENERAL CHEMICAL CORP.                         38          0          0          0          0          0
BASF SYSTEMS CORP.                            402          9          0         15          0          0
PRINTED CIRCUIT CORP                            9          1          0          0          0          5
EXXON COMPANY USA                             303         59          8        112          0          8
MIDDLESEX RESEARCH                             45          0          0          2          0          0
HANSCOM AFB                                     0         60         10        114          0         10
DUNCAN GALVANIZING                             38          0          0          0          0          0
CUSHING HOSPITAL                                0         36          3        108          0          9
PRINTERS OIL SUPPLY                            12          0          0          0          0          0
POLAROID CORPORATION                          361        100          9        153          0         15
MILLIPORE CORP.                                33          2          0          5          0          0
RAYTHEON CO. EDM DIV.                          26         10          3         15          0          1
CALIFORNIA PROD.CORP                           24          0          0          0          0          0
IONICS INCORPORATED                            41          0          0          0          0          0
WOBURN STEEL DRUM                              36          0          0          0          0          0
INTERNATIONAL PAPER                            35          1          0          0          0          0
EASTERN CHEM.LAC                               15          0          0          0          0          0
ACME PRINTING CO.                              32          0          0          0          0          0
INDEPENDENT CABLE                              10          2          0          0          0          0
GOTHAM INK OF NE                               16          0          0          0          0          0
KLP - GENLYTE                                  13          0          0          0          0          0
COMPUGRAPHIC CORPORATION                       13          0          0          0          0          0
FENWAL INC                                     20          1          0          0          0          0
MANN INDUSTRIES INC.                           41          0          0          0          0          0
UNITED LITHOGRAPH INC.                         53          0          0          0          0          0
PETER GRAY CORPORATION                         12          0          0          0          0          0
LEE PRODUCTS CO.                               25          0          0          0          0          0
MAX PAX INDUSTRY                               83          1          0          2          0          0
MADICO,INC.                                    57          6          0          0          0          0
ENTWISTLE COMPANY                              17          0          0          0          0          0
R.R. DONNELLEY & SONS                          13          0          0          0          0          0
CAMBRIDGE PLATING CO                           34          0          0          0          0          0
DIGITAL EQUIPMENT CO.                          20          9          1          0          0          0
UNITRODE CORP.                                 17          0          0          0          0          0
CONTINENTAL BRANDS                             24          0          0          0          0          0
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SAMS   Report Date: 10/29/93   PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
Report Time: 13:40:11   TONS/YEAR

PLANT NAME	VOC	NOx	CO	SO2	PM10	TSP
FINISHIELD CORP	14	0	0	0	0	0
AMERICRAFT CARTON INC	43	4	0	25	0	3
IDEAL TAPE CO.	143	0	0	0	0	0
MAJILITE CORP	107	3	0	0	0	0
ROCHE BROTHERS	26	0	0	0	0	0
HOLLINGSWORTH & VOSE	34	32	2	204	0	16
BRADFORD INDUSTRIES	251	2	0	0	0	0
JAMES RIVER-PEPPERELL	3	26	2	74	0	6
SILICON TRANSISTOR CO.	19	0	0	0	0	0
AVCO CORP.-TEXTRON	2	129	15	0	0	0
RAYTHEON CO.	51	12	0	22	0	2
BAKER COMMODITIES	1	54	10	131	0	11
TEWKSBURY HOSPITAL	0	32	6	63	0	6
CONGRESS TECH. SPRAY	18	0	0	0	0	0
LOWELL COGEN CO.	6	183	104	4	0	12
COLONIAL GAS LNG FACILITY	1	111	15	0	0	0
C.R.BARD INC. (USCI)	15	0	0	0	0	0
N.AMERICAN DIRECTORY CO.	31	0	0	0	0	0
NYES JAPENAMELAC CO	18	0	0	0	0	0
FORT DEVENS-DIR ENGR BLDG	7	22	1	159	0	2
RUBBAIR IND.	17	0	0	0	0	0
COURIER/MURRAY PRINTING CO.	92	2	0	12	0	0
NASHUA CORPORATION	9	0	0	0	0	0
Total for Middlesex Co	4129	2235	329	2440	4	238
NANTUCKET ELECTRIC CO.	37	1722	184	15	0	87
Total for Nantucket Co	37	1722	184	15	0	87
PLYMOUTH RUBBER CO.	432	45	3	132	0	9
FEELEYS ENAMEL CO.	20	0	0	0	0	0
BIRD INC.	4	9	28	2	0	119
HOLLINGSWORTH & VOSE	12	18	1	113	0	9
WELLESLEY COLLEGE	0	38	4	219	0	16
POLAROID CORPORATION	18	19	2	50	0	3
GTE GOVT.SYSTEM CORP	36	9	0	30	0	3
CITGO PETROLEUM CORP	267	0	0	0	0	0
BRAINTREE ELECTRIC	10	305	84	4	0	11
PROCTER & GAMBLE	1	112	11	322	0	37
CLEAN HARBORS INC.	26	2	0	1	0	6
WOLLASTON ALLOYS INC.	50	1	0	0	0	18
MCI NORFOLK	0	42	3	120	0	9

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PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
TONS/YEAR

PLANT NAME	VOC	NOx	CO	SO2	PM10	TSP
INDUSTRIAL HEAT TREATMENT	15	2	0	0	0	0
INTERNATIONAL EQUIPMENT	14	0	0	0	0	28
TERKELSEN MOLDING CO	25	0	0	0	0	0
SEMLINE INC.	43	0	0	0	0	0
AVON TAPE INC	28	0	0	0	0	0
GILTSPUR/BOSTON	12	0	0	0	0	0
ALPINE PRESS INC.	70	0	0	0	0	0
WEHSCO	10	0	0	0	0	0
SAVOGRAN CO	22	0	0	0	0	0
FRANKLIN PAINT CO	16	0	0	2	0	0
BOSTON EDISON/STA446	0	16	4	10	0	0
WRENTHAM STATE SCHOOL	0	36	4	103	0	8
CONSOLIDATED COATING	22	0	0	0	0	0
Total for Norfolk Co	1153	654	144	1108	0	276
NEW ENG.BOOK COMPONENTS	17	0	0	0	0	0
EASTERN PROCESS CO.	26	0	0	0	0	0
MCI BRIDGEWATER	0	54	6	156	0	12
STILES & HART BRICK	0	33	32	122	0	256
E.L.LEBARON FOUNDRY	31	1	14	0	0	4
FOOT JOY INC	13	0	0	5	0	11
NORWICH LEATHER CO.	10	0	0	0	0	0
BARBOUR CORP.INC.	11	0	0	0	0	0
MUELLER CORPORATION	10	0	0	0	0	0
ARCATA GRAPHICS HALL	56	1	0	0	0	0
WES-PINE MILLWORK	13	0	0	0	0	0
LITECONTROL CORP.	23	0	0	0	0	0
BOSTON WHALER INC.	25	0	0	1	0	0
NATIONAL COATING CORP.	55	0	0	0	0	0
VENTURE TAPE	124	3	1	0	0	0
WOOD-HU KITCHENS	22	0	0	0	0	0
SHAWMUT MILLS	44	0	0	0	0	0
WHITMAN FOUNDRY INC	0	0	45	0	0	1
K-F BRICK CO. INC.	4	51	7	5	0	28
Total for Plymouth Co	484	143	105	289	0	312
BOSTON EDISON-NEW BOSTON	54	6903	393	8776	0	729
BURTMAN IRON WORKS	27	0	0	0	0	0
GILLETTE COMPANY,THE	18	292	22	77	0	8
PATRIOT PAPER CORP.	0	0	0	0	0	0
BOSTON EDISON-MYSTIC STATION	76	6370	839	12901	0	719

SAMS Report Date: 10/29/93
Report Time: 13:40:11

PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
TONS/YEAR

PLANT NAME	VOC	NOx	CO	SO2	PM10	TSP
DYNAGRAF, INC.	27	0	0	0	0	0
COASTAL OIL N.E. INC	353	13	0	37	0	2
MAGNESIUM CASTING CO	30	1	0	0	0	3
MODERN ELECTROPLATING	32	1	0	4	0	0
MOBIL OIL CORP.	349	5	0	11	0	0
GULF OIL COMPANY	399	0	0	0	0	0
GLOBAL PETROLEUM CORP	99	0	0	0	0	0
B. P. OIL INC.	245	0	0	0	0	0
BOSTON THERMAL ENERGY	2	1039	81	512	0	14
GRAPHICS ARTS INC.	15	0	0	0	0	0
COGENERATION MGMT CO.	18	3261	791	615	0	12
MASSPORT LOGAN AIRPORT	0	118	12	48	0	3
COURT SQUARE PRESS	12	2	0	3	0	0
PEARL BOOKBINDING CO	2	0	0	0	0	0
NIMROD PRESS	32	0	0	0	0	0
DYNAGRAF INC	16	0	0	0	0	0
L.H.DALOZ,INC.	29	1	0	2	0	0
MIT POWER PLANT	0	115	15	105	0	10
M.W.R.A.- DEER ISLAND	38	565	122	46	0	40
Total for Suffolk Co	1873	18686	2274	23137	0	1540
L.S. STARRETT CO.	65	70	14	26	0	8
E.R.BUCK CHAIR CO	14	0	0	1	0	0
DELTA SUPRENANT	47	2	0	9	0	0
PWA ROLLAND DECOR INC.	26	67	5	168	0	13
SEAMAN PAPER CO.	0	60	6	177	0	12
STOROPACK INC.	0	0	0	0	0	0
NOVACOR CHEMICAL, INC.	13	1	0	2	0	1
EDDINGTON THREAD MFG.	84	0	0	0	0	0
CHURCHILL COATINGS	43	0	0	0	0	0
FLEXCON COMPANY INC	185	7	0	0	0	0
CRANSTON PRINT WORKS	175	80	8	508	0	39
CHEMDESIGN CORP	13	4	0	0	0	0
WRIGHT LINE INC	46	0	0	1	0	0
NORTON CO.	230	273	15	408	0	109
J.R.CENTRL STEAM PLANT	1	267	23	907	0	69
CHARLES G. ALLEN	0	0	60	2	0	1
AMERICAN TISSUE MILLS	53	85	8	244	0	19
AMERICAN OPTICAL	44	147	11	215	0	16
BAY STATE ABRASIVES	10	17	2	26	0	2
HOWARD BROS MFG.	17	0	0	0	0	0
INNER-TITE CORP.	18	0	0	0	0	0
WORC ENVELOP CO.	17	0	0	0	0	0

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SAMS       Report Date: 10/29/93              PLANT SUMMARIES OF EMISSIONS AT PROCESS LEVEL
Report Time: 13:40:11                                            TONS/YEAR

PLANT NAME                                    VOC       NOx        CO       SO2      PM10       TSP
----------------------------------------  --------  --------  --------  --------  --------  --------
NYLCO CORP.                                     15         2         0         0         0         0
MODERN CONTRACT                                 21         1         0         3         0         0
EUSEY PRESS                                     18         0         0         0         0         0
SANNCOR IND                                     16         0         0         0         0         0
P J KEATING CO.                                  6        19        11        72         0       117
POLYFORM INC.                                   32         2         0         4         0         0
UMASS MED CENTER                                 0       106        13        94         0        10
MICRON MEDICAL PRODUCTS                         15         0         0         0         0         0
ALLEGRO MICROSYSTEMS                            54         8         1        26         0         5
JOHN NISSEN BAKING CO.                          54         0         0         0         0         0
CUSTOM PAPERS GP.INC.                           16         2         0         6         0         0
HUB FABRIC LEATHER CO.                          82         0         0         0         0         0
S BENT & BROTHERS                               31         9         7        21         0        16
C.H.HARTSHORN INC.                              11         0         0         0         0        14
NICHOLS & STONE CO.                             96         2         5         2         0        38
WHEELABRATOR - MILLBURY                         24       881       267       154         0        74
SIMPLEX TIME RECORDER                           18         9         1        15         0         1
RAND WHITNEY PKG CORP                           21         0         0         0         0        11
POLYCLAD LAMINATES                              23         1         0         4         0         0
LILLY IND. COATINGS                             19         0         0         4         0         0
CUSTOM CTG + LAMINAT                            23         1         0         0         0         0
WYMAN-GORDON COMPANY                             9        53         4        67         0        39
AUTOM.ROLLS OF NE                               40         1         0         0         0         0
TENNECO ST 264                                   1        53        21         0         0         2
ECC CORPORATION                                 10         0         0         3         0         0
UPPER BLACKSTONE SSI                            24       126         0        26         0        51
TOWN & COUNTRY CLEANER                          23         0         0         0         0         0
THE KELLY CO                                    15         0         0         0         0         0
FLEXCON CO., INC.                               85         2         1         0         0         0
MONSON CHEMICALS                                10         0         0         0         0         0
ARCHER RUBBER CO                               304         8         0        22         0         2
BENJAMIN MOORE & CO.                            26         0         0         0         0         0
AMERICAN NATIONAL CAN                           55      1398        67      1070         0        48
ENRON POWER                                      0         0         0         0         0         0
------------------------------------------------------------------------------------------------------
Total for Worcester Co                        2298      3744       550      4287         0       717
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======================================================================================================
Total for Massachusetts                      17579    112518     10223    262414         4      5832
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======================================================================================================
Total for Report                             17579    112518     10223    262414         4      5832
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TABLE A-2

STATIONARY POINT SOURCE EMISSIONS BY COUNTIES 1990
VOC, NOX AND CO

pointcty3
oct 29 93

COUNTIES	VOC TPY	VOC TPSD* /52*6	NOX TPY	NOX TPSD* /52*6	CO TPY	CO TPSD* TPWD* /52*6
BARNSTABLE	172	0.551	13982	44.814	1555	4.984
BERKSHIRE	333	1.067	917	2.939	277	0.888
BRISTOL	2314	7.417	40459	129.68	1950	6.250
DUKES	0	0.000	0	0.000	0	0.000
ESSEX	2105	6.747	22354	71.647	1315	4.215
FRANKLIN	97	0.311	423	1.356	28	0.090
HAMPDEN	2448	7.846	6181	19.811	1155	3.702
HAMPSHIRE	136	0.436	1018	3.263	357	1.144
MIDDLESEX	4129	13.234	2235	7.163	329	1.054
NANTUCKET	37	0.119	1722	5.519	184	0.590
NORFOLK	1153	3.696	654	2.096	144	0.462
PLYMOUTH	484	1.551	143	0.458	105	0.337
SUFFOLK	1873	6.003	18686	59.891	2274	7.288
WORCESTER	2298	7.365	3744	12.000	550	1.763
STATE	17579	56.343	112518	360.63	10223	32.766

* /52*6 : ACTIVITY IS ESTIMATED AT 6 DAYS PER WEEK AT 52 WEEKS

REFERENCES FOR STATIONARY POINT SOURCE INVENTORY

1. EPA "Compilation of Air Pollutant Emission Factors" Vol. 1 Stationary Point and Area Sources. 4th ed. OAQPS RTP. N.C. September 1985 and Supplements A to D September 1991.

2. EPA "Emission Inventory Requirements for Carbon Monoxide State Implementation Plan" OAQPS RTP. N.C. 450/4-91-011, March 1991.

3. EPA "Emission Inventory Requirements for Ozone State Implementation Plan" OAQPS RTP. N.C. 450/4-91-010 March 1991.

4. EPA "Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume 1 General Guidance for Stationary Sources". OAQPS Planning and Standards RTP N.C. EPA-450/4-91-016, May 1991.

5. EPA "SIP Air Pollutant Inventory Management System" Version 4.1 (SAMS). Pacific Environmental Services, Durham, N.C. September 1991.

6. Massachusetts DEP -Division of Air Quality Control, Stationary Source Emissions Inventory System (SSEIS) 1990.

7. Directory of Massachusetts Manufacturers 1991/1992 Edition Associated Industries of Massachusetts, George D.Hall Co., 1991.

8. AIRS Facility Subsystem EPA. RTP. N.C.

9. EPA Region 1 Letter to Robert Boisselle from David Conroy re: non-requirement of Point Sources within 25 mile radius of non-attainment area. April 8, 1992.

10. EPA's Comments on 1990 Draft Emission Inventories, September 1 1992.

File: Point90

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SECTION B
AREA SOURCES

1. WASTE TREATMENT
2. GASOLINE DISTRIBUTION
3. SOLVENT EVAPORATION
4. FUEL COMBUSTION AND FIRES

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B.1 WASTE TREATMENT EMISSIONS

VOC emissions from Waste Treatment Management practices can be divided into five subcategories as outlined in Section 3.5 and Table 4.10-1 of Volume 1[1].

i. Publicly Owned Treatment Works (POTWs)

ii. Industrial Wastewater and Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs)

iii. Municipal Solid Waste Landfills

B.1-i PUBLICLY OWNED TREATMENT WORKS (POTWs)

According to EPA's Volume 1[1], recent research has shown that POTWs are significant sources of VOC in their wastewater treatment operations. Additionally, the concentration of VOC found in POTW influent has been shown to be directly proportional to the industrial contribution to a POTW. This implies that VOC emission estimates can be allocated to the county level based upon the total industrial flow per county. The general national estimate of the contribution of industrial wastewater to POTW's as given in Volume 1 is about 16% of the total influent. EPA's national emission factor for POTWs is 1.1×1^{-4} lbs/VOC emitted per gallon industrial wastewater discharged to a POTW.

The DEP-BWP Division of Industrial Wastewater Management was contacted for POTW wastewater flow data. Gene Romero and Peter Dore provided a listing of the statewide industrial wastewater flow for each plant which discharge into their respective POTWs for 1990 and are presented in Appendix B.1-1.

EPA Region I National Pollutant Discharge Elimination System (NPDES) Program Operations Branchs was contacted for POTW and TSDF wastewater flow data. Mr. Ed Kim provided the NPDES Permit Compliance System Report for POTW and TSDF effluent discharge rates for 1990[1].

The DEP and EPA POTW databases were crosschecked for missing data. The EPA NPDES data was supplemented by data from DEP and are presented in Table B.1-1. The DEP facilities not reported in NPDES do not have a NPDES number as shown in Table B.1-1.

Volume 1 estimates that POTWs consist of 16% industrial wastewater, and the emission factor given is 1.1 x 10^{-4} or 0.00011 lbs. VOC per gallon industrial wastewater. This percentage was used in Table B.1-1 for the EPA NPDES facilities. The POTW's with industrial flow reported by DEP in Appendix B.1-1 and included in Table B.1-1 is taken as 100% industrial flow.

Another methodology available is the use of the Surface Impoundment Modeling Systems (SIMS)[4,5] which require detailed information about the POTW such as surface area treatment types and industrial categories flowing into the system.

National Emission Factor Methodology - POTW

The following is the national emission factor methodology for estimating POTW VOC emissions for Barnstable County:

53.26 m.gal/year x 0.00011 lb/gal = 5,858.6 lb VOC/2000 lbs. = 2.93 Tons VOC/365 days x 1.4 = 0.011 TPSD.

The Barnstable Treatment Plant was not adjusted for the 16% industrial content because it was taken from the DEP database

TABLE B.1-1

SEWERAGE SYSTEMS- POTW'S 1990

potw3 VOC EMISSIONS BY COUNTIES

10/8/92 revised

2/20

potwcnty

NPDES	FACILITY NAME	CITY/TOWN	COUNTY	NON NPDES MG/YR	(.16) NPDES 1990 MG/YR	INDUSTRIAL W.WATER 1990 MG/YR	EF .00011 VOC TPY	VOC TPY BY COUNTY	VOC TPSD BY COUNTY
NO NPDES	BARNSTABLE	BARNSTABLE	BARNSTAB	29.97		29.97	1.65		
NO NPDES	FALMOUTH	FALMOUTH	BARNSTAB	23.29		23.29	1.28	2.93	0.011
						53.26	2.93		
100315	ADAMS	ADAMS T	BERKSHIR	0.55		0.55	0.03		
101524	GREAT BARRINGTON	G.BARRINGTON T	BERKSHIRE		1162.14	185.94	10.23		
100153	LEE WWTF	LEE	BERKSHIRE		324.33	51.89	2.85		
101681	PITTSFIELD SEWER	PITTSFIELD	BERKSHIR	276.80		276.80	15.22		
100510	HOOSAC WPCF	WILLIAMSTOWN	BERKSHIRE		2134.35	341.50	18.78	47.12	0.181
						856.68	47.12		
NO NPDES	AUSHNET WW	ACUSHNET	BRISTOL	54.75		54.75	3.01		
100595	ATTLEBORO	ATTLEBORO	BRISTOL	174.93		174.93	9.62		
101605	DARTMOUTH WPCF	DARTMOUTH	BRISTOL	1.46		1.46	0.08		
100765	FAIRHAVEN	FAIRHAVEN	BRISTOL	6.39		6.39	0.35		
100382	FALL RIVER STP	FALL RIVER	BRISTOL	460.52		460.52	25.33		
101702	MANSFIELD	MANSFIELD	BRISTOL	137.84		137.84	7.58		
100781	NEW BEDFORD WTP	NEW BEDFORD	BRISTOL	433.15		433.15	23.82		
101036	N.ATTLEBORO	N.ATTLEBORO	BRISTOL	104.71		104.71	5.76		
100676	SOMERSET	SOMERSET	BRISTOL		825.36	132.06	7.26		
100897	TAUNTON	TAUNTON	BRISTOL	206.43		206.43	11.35	94.17	0.361
						1712.24	94.17		
		NO DATA	DUKES		0.00	0.00	0.00	0.00	0.000
101745	AMESBURY	AMESBURY	ESSEX	90.12		90.12	4.96		
100625	GLOUCESTER	GLOUCESTER	ESSEX	20.59		20.59	1.13		
101621	HAVERHILL WPAF	HAVERHILL	ESSEX	140.66		140.66	7.74		
100609	IPSWICH	IPSWICH	ESSEX	19.33		19.33	1.06		
100352	LYNN	LYNN	ESSEX	387.60		387.60	21.32		
100891	MANCHESTER WTP	MANCHESTER	ESSEX		212.16	33.95	1.87		
101427	NEWBURYPORT	NEWBURYPORT	ESSEX	90.74		90.74	4.99		
0	MERRIMACK RIV.BAS	NEWBURYPORT	ESSEX	14.60		14.60	0.80		
100447	GREATER LAWRENCE	NORTH ANDOVER	ESSEX	1003.60		1003.60	55.20		
100145	ROCKPORT MTP	ROCK PORT	ESSEX		285.30	45.65	2.51		
NO NPDES	SALEM	SALEM	ESSEX	2.48		2.48	0.14		
100501	SOUTH ESSEX SD	SALEM	ESSEX	70.83		70.83	3.90		
102873	SALISBURY	SALISBURY	ESSEX		136.74	21.88	1.20		
101907	SWAMPSCOTT	SWAMPSCOTT	ESSEX		939.00	150.24	8.26	115.07	0.441
						2092.26	115.07		
101940	DEERFIELD	DEERFIELD	FRANKLIN	1.10		1.10	0.06		
101648	SOUTH DEERFIELD	DEERFIELD	FRANKLIN	181.95		181.95	10.01		
101052	ERVING (T)	ERVING	FRANKLIN		684.30	109.49	6.02		
101214	GREENFIELD	GREENFIELD	FRANKLIN	18.06		18.06	0.99		
101516	MILLERS FALLS VIL	MILLERS FALLS	FRANKLIN		192.60	30.82	1.69		
100137	MONTAGUE	MONTAGUE	FRANKLIN	20.44		20.44	1.12		
101257	ORANGE	ORANGE	FRANKLIN		420.21	67.23	3.70		

TABLE B.1-1 (CONT'D.)

NO NPDES	SUNDERLAND	SUNDERLAND	FRANKLIN	0.80		0.80	0.04		
NO NPDES	TURNERS FALLS	TURNERS FALLS	FRANKLIN	0.00		0.00	0.00	23.64	0.091
						429.89	23.64		
NO NPDES	AGAWAM RIV	AGAWAM	HAMPDEN	13.87		13.87	0.76		
NO NPDES	AGAWAM	AGAWAM	HAMPDEN	209.73		209.73	11.54		
101508	CHICOPEE	CHICOPEE	HAMPDEN	1871.00		1871.00	102.91		
100455	SOUTH HADLEY WTP	CHICOPEE	HAMPDEN		1242.54	198.81	10.93		
101630	HOLYOKE MUAI TREA	HOLYOKE	HAMPDEN	313.56		313.56	17.25		
NO NPDES	LUDLOW	LUDLOW	HAMPDEN	1.83		1.83	0.10		
101168	PALMER	PALMER	HAMPDEN	64.68		64.68	3.56		
101613	SPRINGFIELD-BONDI	SPRINGFIELD	HAMPDEN	3155.07		3155.07	173.53		
101800	WESTFIELD WPCP	WESTFIELD	HAMPDEN		1165.83	186.53	10.26		
1571	COLUMBIA MANUF. C	WESTFIELD	HAMPDEN	4.92		4.92	0.27		
NO NPDES	WILBRAHAM	WILBRAHAM	HAMPDEN	1.46		1.46	0.08	331.18	1.270
						6021.46	331.18		
100218	AMHERST	AMHERST	HAMPSHIRE		1674.60	267.94	14.74		
10248	BELCHERTOWN STATE	BELCHERTOWN	HAMPSHIRE		265.50	42.48	2.34		
101478	EASTHAMPTON WTP	EASTHAMPTON	HAMPSHIRE		888.00	142.08	7.81		
NO NPDES	HADLEY	HADLEY	HAMPSHIR	1.47		1.47	0.08		
101818	N.H. MUNI TREAT P	NORTH HAMPTON	HAMPSHIRE		1896.90	303.50	16.69		
NO NPDES	NORTHAMPTON	NORTHAMPTON	HAMPSHIR	224.03		224.03	12.32		
NO NPDES	S.HADLEY	S.HADLEY	HAMPSHIR	246.12		246.12	13.54		
100889	WARE WPCP	WARE	HAMPSHIR	54.02		54.02	2.97	70.49	0.270
						1281.64	70.49		
100013	AYER	AYER	MIDDLESE	89.10		89.10	4.90		
101711	BILLERICA-LETCHWO	BILLERICA	MIDDLESE	20.50		20.50	1.13		
100668	CONCORD	CONCORD	MIDDLESE	3.70		3.70	0.20		
101788	HUDSON	HUDSON	MIDDLESE	168.90		168.90	9.29		
100633	LOWELL MSS	LOWELL	MIDDLESE	791.93		791.93	43.56		
NO NPDES	WESTERLY	MARLBORO	MIDDLESE	6.90		6.90	0.38		
100498	MARLBORO E	MARLBORO	MIDDLESEX		1112.40	177.98	9.79		
100480	MARLBORO W	MARLBORO	MIDDLESE	81.52		81.52	4.48		
101001	MAYNARD STP	MAYNARD	MIDDLESEX		593.37	94.94	5.22		
NO NPDES	PEPPEREL	PEPPEREL	MIDDLESE	18.26		18.26	1.00	79.96	0.307
						1453.73	79.96		
NO NPDES	SURFSIDE	NANTUCKET	NANTUCKE	0.66		0.66	0.04	0.04	0.000
NO NPDES	COHASSET	COHASSET	NORFOLK	0.01		0.01	0.00		
100978	MEDFIELD	MEDFIELD	NORFOLK	1.13		1.13	0.06		
NO NPDES	MEDWAY	MEDWAY	NORFOLK	134.32		134.32	7.39		
102598	CHARLES RIVER PVD	MEDWAY	NORFOLK	17.61		17.61	0.97		
NO NPDES	MILLIS	MILLIS	NORFOLK	1.28		1.28	0.07		
102253	NORFOLK/WALPOLE	WALPOLE	NORFOLK		109.50	17.52	0.96		
NO NPDES	WESTWOOD	WESTWOOD	NORFOLK	4.93		4.93	0.27	9.72	0.037
						176.80	9.72		
NO NPDES	ABINGTON WW	ABINGTON	PLYMOUTH	2.77		2.77	0.15		
102237	MCI-BRIDGEWATER W	BRIDGEWATER	PLYMOUTH		194.82	31.17	1.71		
100641	BRIDGEWATER STP	BRIDGEWATER	PLYMOUTH		260.40	41.66	2.29		
101010	BROCKTON	BROCKTON	PLYMOUTH	20.15		20.15	1.11		
101231	HULL	HULL	PLYMOUTH		552.00	88.32	4.86		

TABLE B.1-1 (Cont'd)

101231	HULL	HULL	PLYMOUTH		552.00	88.32	4.86		
100030	MARION	MARION	PLYMOUTH	3.53		3.53	0.19		
101737	MARSHFIELD	MARSHFIELD	PLYMOUTH		310.26	49.64	2.73		
101591	MIDDLEBOROUGH STP	MIDDLEBOROUGH	PLYMOUTH	555.79		555.79	30.57		
100587	PLYMOUTH	PLYMOUTH	PLYMOUTH	6.57		6.57	0.36		
101923	ROCKLAND WPCP	ROCKLAND	PLYMOUTH	2.43		2.43	0.13		
101893	WAREHAM	WAREHAM	PLYMOUTH	2.96		2.96	0.16	44.27	0.170
						805.00	44.27		
102351	MWRA/MDC	BOSTON MDC/MWRA	SUFFOLK	0.00	(ACCOUNTED FOR AS A POINT SOURCE)				
100005	ATHOL	ATHOL	WORCESTER	14.24		14.24	0.78		
100340	TEMPLETON WWTP	BALDWINVILLE	WORCESTER		519.90	83.18	4.58		
NO NPDES	BARRE	BARRE	WORCESTER	4.81		4.81	0.26		
101141	CHARLTON	CHARLTON	WORCESTER		34.08	5.45	0.30		
100404	MWRA-CLINTON FAC	CLINTON	WORCESTER		863.61	138.18	7.60		
NO NPDES	CLINTON	CLINTON	WORCESTER	3.65		3.65	0.20		
100706	DUDLEY SEVER DEPT	DUDLEY	WORCESTER	0.11		0.11	0.01		
101281	WEST FITCHBURG WT	FITCHBURG	WORCESTER	39.61		39.61	2.18		
100986	FITCHBURG, EAST W	FITCHBURG	WORCESTER		2916.00	466.56	25.66		
NO NPDES	GARDNER	GARDNER	WORCESTER	20.59		20.59	1.13		
101311	GRAFTON	GRAFTON	WORCESTER	6.62	394.50	69.74	3.84		
102202	HOPEDALE STP	HOPEDALE	WORCESTER		158.94	25.43	1.40		
100579	MILFORD STP	HOPEDALE	WORCESTER	128.52		128.52	7.07		
100617	LEOMINSTER DPW	LEOMINSTER	WORCESTER	15.77		15.77	0.87		
100650	MILLBURY WWTP	MILLBURY	WORCESTER	5.26		5.26	0.29		
102369	UPPER BLACKSTONE	MILLBURY	WORCESTER	290.33		290.33	15.97		
100722	NORTH BRIDGE	N.BRIDGE	WORCESTER	24.82		24.82	1.37		
NO NPDES	SOUTHBORO	SOUTHBORO	WORCESTER	0.18		0.18	0.01		
100901	SOUTHBRIDGE	SOUTHBRIDGE	WORCESTER	14.48		14.48	0.80		
100919	SPENCER STP	SPENCER	WORCESTER	2.37		2.37	0.13		
NO NPDES	STURBRIDGE	STURBRIDGE	WORCESTER	9.49		9.49	0.52		
100994	GARDNER-W.PCF	TEMPLETON	WORCESTER	843.15		843.15	46.37		
102440	UXBRIDGE WTP	UXBRIDGE	WORCESTER	146.00		146.00	8.03		
101567	WARREN	WARREN	WORCESTER	127.75		127.75	7.03		
100439	WEBSTER D.P.W	WEBSTER	WORCESTER	3.38		3.38	0.19		
100412	WESTBORO	WESTBORO	WORCESTER	124.52		124.52	6.85		
100196	WEST UPTON	WEST-UPTON	WORCESTER		109.18	17.47	0.96		
100862	WICHENDON	WICHENDON	WORCESTER	0.06		0.06	0.00		
NO NPDES	WORCESTER	WORCESTER	WORCESTER	0.11		0.11	0.01		
1001061	NORTH BROOK FIELD	W.BROOK FIELD	WORCESTER		205.26	32.84	1.81	146.19	0.561
						2658.06	146.19	146.19	0.561
			TOTAL	13896.22	22784.08	17541.67	964.79	964.79	3.701

TABLE B.1-2

potwams

SEWERAGE SYSTEMS - PUBLICLY OWNED TREATMENT WORKS (POTW'S) VOC EMISSIONS 1990

1 SCC : 26-30-020-000

STATE ACTIVITY LEVEL : 17,541 MILLION GALLONS PER YEAR

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY	OZ PO ACTIV *1.4*92	VOC TPY EM.FAC 110 LB/M.GL	VOC PO TPSD /92
1	BARNSTABLE	186605	3.1%	53	19	2.92	0.011
2	BERKSHIRE	139352	2.3%	857	302	47.14	0.181
3	BRISTOL	506325	8.4%	1712	604	94.16	0.361
4	DUKES	11639	0.2%	0	0	0.00	0.000
5	ESSEX	670080	11.1%	2092	738	115.06	0.441
6	FRANKLIN	70092	1.2%	430	152	23.65	0.091
7	HAMPDEN	456310	7.6%	6021	2125	331.16	1.270
8	HAMPSHIRE	146568	2.4%	1282	452	70.51	0.270
9	MIDDLESEX	1398468	23.2%	1453	513	79.92	0.307
10	NANTUCKET	6012	0.1%	1	0	0.06	0.000
11	NORFOLK	616087	10.2%	177	62	9.74	0.037
12	PLYMOUTH	435276	7.2%	805	284	44.28	0.170
13	SUFFOLK	663906	11.0%	0	0	0.00	0.000
14	WORCESTER	709705	11.8%	2658	938	146.19	0.561
	STATE	6016425	100.0%	17541	6190	964.76	3.700

ACTIVITY LEVEL UNITS : MILL GAL
ACTIVITY LEVEL PROCESS : PROCESSED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 35.3 %

EMISSION FACTORS : VOC: 110 LB
EMISSION FACTOR UNITS : LB/M.GAL VOL.1 SEC.3.5.1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 72% SAT : 14 % SUN : 14 %

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

which is 100% industrial wastewater. Appendix B.1-1 presents the DEP industrial flow data into POTWs. The NPDES POTW facilities were adjusted for the 16% industrial content and the emissions are presented in Table B.1-1 in tons per year (TPY) and tons per summer day (TPSD) by county. The DEP list of industrial flow into POTW's in Appendix Table B.1-1 is not adjusted and taken at 100% industrial flow. The summer day adjustment factor of 1.4 was obtained from Table 5.8-1 of Volume 1.

Total Area Source VOC emissions for POTWs for Massachusetts using the EPA national emission factor, is estimated at 964.79 tons for 1990 and 3.701 tons per summer day and presented in Table B.1-1. Table B.1-2 is designed for entry into the AIRS-AMS System.

Surface Inpoundment Modeling Systems - POTW's

The SIMS Model[4,5] is not utilized for POTWs because about one third of the DEP plants are missing SIC codes as shown in Appendix Table B.1-1. Since two of the major inputs are the SIC codes and flow rates which mainly determine emissions, it is not feasible at this time to use SIMS for POTW VOC estimation.

B.1-ii INDUSTRIAL WASTEWATER AND HAZARDOUS WASTE TREATMENT, STORAGE AND DISPOSAL FACILITIES (TSDFs)

Data for TSDFs was obtained from EPA Region I NPDES Programs Operation Branch[3] and are presented in Table B.1-3. TSDF wastewater is considered to be mainly industrial discharge, whereas, POTWs consist of residential sewage, commercial and industrial wastewater. It is the industrial portion of the wastewater which is considered to be the source of VOC emissions. For POTWs, the industrial wastewater composition of the total influent was estimated in Volume 1 at about 16% whereas, for TSDFs it is assumed to be 100%. The flow rates from the electric utilities had to be excluded from the total industrial flow rates because most of their wastewater operations are from their boiler cooling systems and hence, not part of any manufacturing or industrial process.

The two methodologies for estimating TSDF VOC emissions as presented in Volume 1 were utilized. The first methodology utilizes the national emission factor as was used for POTWs. The second methodology is the SIMS computer model.4,5

The National Emission Factor Methodology - TSDFS

The following is the methodology for estimating TSDF VOC emissions for Crane & Co. in Berkshire County:

Flow rate 4.408 m.gal/dy x 365 = 1,609.08 M.gal/yr x 0.00011 lb/gal = 176,998.8 lb/yr 2,000 lbs. = 88.50 tons.

All the facilities in Berkshire County amounted to a total of 227.89 TPY as shown in Table B.1-3. The summer adjustment factor of 1.2 taken from Volume 1 Table 5.8-1, is applied to the 227.89 TPY after dividing by 365 to set a total of 0.749 TPSD. TSDF VOC emissions for other counties are presented in Table B.1-3. The total TSDF VOC emissions for the state was estimated at 2,939.70 TPY or 9.665 TPSD. Table B.1-4 is designed for entry of data into the AIR-AMS System.

TABLE B.1-3

tsdf90a3

INDUSTRIAL WASTEWATER TREATMENT,STORAGE AND DISPOSAL FACILITIES (TSDF'S) 1990

10/92 EXCLUDING POWER PLANTS SIC 4911

NPDES	FACILITY NAME	CITY/TOWN	CNTY	SIC	OPERATION	FLOW 1990 MGl/DY	FLOW 1990 MGl/YR	FLOW-ELEC U MGL/YR	EM.FAC 1990 VOC EM TPY	1990 VOC TPSD	SIMS 1990 VOC MG/YR	SIMS 90 VOC TPY
									.00011 lb	/365*1.2		
									VOC/Gl			
4928	CANAL ELEC. # 1 P	SANDWICH	BANS	4911	ELECTRIC SE	38.19	13938.30	0	0.00	0.000	0.00	0.00
671	CRANE & CO.	DALTON	BERK	2621	PAPER MILL	4.41	1609.08	1609.1	88.50		1.47	1.62
5371	KIMBERLY-CLARK CO	LEE	BERK	2621	PAPER MILL	4.54	1656.24	1656.2	91.09		1.50	1.65
1716	MEAD CORP-LAUREL	LEE	BERK	2621	PAPER MILL	1.13	411.00	411.0	22.61		0.53	0.58
1848	MEAD CORP-WILLOW	LEE	BERK	2621	PAPER MILL	1.18	432.00	432.0	23.76		0.54	0.60
1031	WESTFIELD RIV PAP	LEE	BERK	2621	PAPER MILL	0.10	35.10	35.1	1.93		0.05	0.06
							TOTAL	4143.4	227.89	0.749	4.09	4.51
2275	BLANE POLYMERS VI	MANSFIELD	BRIS	3081	PLAST. & RE	0.05	19.50	19.5	1.07		0.31	0.34
4910	COMM. ELEC.CANNON	BEDFORD	BRIS	4911	ELECTRIC SE	23.71	8653.86	0.0	0.00		0.00	0.00
3930	CORNELL-DUBEL.ELE	N.BEDFORD	BRIS	3675	ELECTRIC.CO	0.11	39.54	39.5	2.17		0.07	0.08
5291	I.C.I AMERICAS.IN	DIGHTON	BRIS	2865	CYCLIC CRUD	0.93	338.37	338.4	18.61		60.20	66.36
4766	L.G.BALFOUR	ATTLEBORO	BRIS	3911	JEWELRY P.M	0.03	9.99	10.0	0.55		0.00	0.00
1856	MONTAUP ELECT	SOMERSET	BRIS	4911	ELECTRIC SE	104.28	38060.85	0.0	0.00		0.00	0.00
3654	NEW ENG POWER-BRA	SOMERSET	BRIS	4911	ELECTRIC SE	1115.9	407301.30	0.0	0.00		0.00	0.00
4600	RELIABLE ELECTRO.	NORTON	BRIS	3471	PLATING&POL	0.00	1.05	1.1	0.06		0.00	0.00
4821	REVERE COPPER PRO	N.BEDFORD	BRIS	3351	PLATING&POL	0.16	58.68	58.7	3.23		0.65	0.72
2241	TAUNTON LIGHT CLE	TAUNTON	BRIS	4911	ELECTRIC SE	8.76	3197.22	0.0	0.00		0.00	0.00
3786	TAUNTON SILVERSMI	TAUNTON	BRIS	3914	SILVER & PL	0.04	14.16	14.2	0.78		0.04	0.05
30244	EMERALD SQ MALL	N.ATTLEBOR	BRIS	6512	NON-RES BLD	0.84	307.95	308.0	16.94		0.00	0.00
1791	TEXAS INSTRUMENTS	ATTLEBORO	BRIS	3356	SWIT.G.SWIT	1.93	705.75	705.8	38.82		2.54	2.80
5355	TWEAVE INC.	BARROWSVL	BRIS	2211	WEAVING MIL	0.01	2.00	2.0	0.11		0.01	0.01
							TOTAL	1497.0	82.33	0.271	63.82	70.35
			DUKES				0	0.0	0	0	0	0
1261	AT & T	N.ANDOVER	ESSE	3661	TELEPH & TE	0.74	271.66	271.7	14.94		1.08	1.19
1180	BOSTIC CHEM.GROUP	MIDDLETON	ESSE	2891	PLAST. & RE	0.55	200.67	200.7	11.04		26.20	28.88
3905	GENER.ELECT.AF.PL	LYNN	ESSE	3511	TURBINE GEN	56.52	20628.20	20628.2	1134.55		13.80	15.21
281	GOULD INC.	N.BURYPT	ESSE	3613	SWITCH.G. S	0.02	5.73	5.7	0.32		0.03	0.04
5096	NEW ENG POWER STA	SALEM	ESSE	4911	ELECTRIC SE	428.65	156455.97	0.0	0.00		0.00	0.00
28193	REFUSE ENERGY SYS	SAUGUS	ESSE	4953	REFUSE SYST	57.70	21060.00	21060.0	1158.30		0.00	0.00
							TOTAL	42166.3	2319.14	7.625	41.11	45.32
3697	VERATEC GRISWOLD	GRISWOLDV	FRAN	2261	WEAVING MIL	0.86	314.40	314.4	17.29		0.63	0.69
5011	STRATHMORE PAPER	MONTAGUE	FRAN	2621	PAPER MILLS	1.91	696.90	696.9	38.33		0.81	0.89
4367	YANKEE ROWE ATOMI	ROWE	FRAN	4911	ELEC SERVIC	129.55	47286.00	0.0	0.00		0.00	0.00
							TOTAL	1011.3	55.62	0.183	1.44	1.59
1571	COLUMBIA MANUF	WESTFIELD	HAMP	3751	MOTOR/BICYC	0.08	28.74	28.7	1.58		0.13	0.14
5339	HOLYOKE WATER-MT	HOLYOKE	HAMP	4911	ELECTRIC SE	94.78	34596.05	0.0	0.00		0.00	0.00
4995	STRATHMORE PAPER	RUSELL	HAMP	4995	PAPER MILLS	2.56	935.10	935.1	51.43		1.01	1.11
5282	TEXON-USA RUSSEL	RUSSELL	HAMP	2621	PAPER MILLS	0.56	203.61	203.6	11.20		0.28	0.31
4316	WESTFIELD RIVER P	RUSSELL	HAMP	2621	PAPER MILLS	0.20	72.06	72.1	3.96		0.11	0.12
4707	W.SPRINGFIELD STN	W.SPRFLD	HAMP	4911	ELEC SERVIC	79.86	29148.90	0.0	0.00		0.00	0.00
3514	ZERO E.DIV.CORP	MONSON	HAMP	3411	METAL CANS	0.03	10.73	10.7	0.59		0.04	0.04
							TOTAL	1250.2	68.76	0.226	1.57	1.73

TABLE B.1-3 (CONT'D.)

			HAMS			0	0	0.0	0	0	0	0
4898	CAMBRIDGE ELEC	CAMBRIDGE	MIDD	4911	ELEC SERVIC	44.28	16164.00	0.0	0.00		0.00	0.00
833	EXXON OIL-ISLAND	EVERETT	MIDD	5171	PETROL.PROD	0.48	175.02	175.0	9.63		5.53	6.10
4561	HOLLINGSWORTH & V	GROTON	MIDD	2621	PAPER MILLS	1.87	684.00	684.0	37.62		0.80	0.88
5185	JAMES RIVER-PEPPE	E.PEPPERL	MIDD	2621	PAPER MILLS	1.05	385.03	385.0	21.18		0.49	0.54
809	MONSANTO CO-E.P.	EVERETT	MIDD	2819	INDUST.IROR	0.10	35.25	35.3	1.94		1.10	1.21
5304	OLIN CHEMICAL COR	WILMINGTN	MIDD	2869	INDUSTR.ORG	0.02	8.45	8.5	0.46		0.26	0.29
1511	RAYTHEON CO	WAYLAND	MIDD	3625	ELEC.COMPON	0.00	1.69	1.7	0.09		0.03	0.03
1414	RAYTHEON CORP	BILLERICA	MIDD	3672	GUIDED MISS	0.03	11.73	11.7	0.65		0.19	0.21
25241	SILICON TRANS.COR	CHELMSFRD	MIDD	3674	SEMI CONDUC	0.04	15.32	15.3	0.84		0.06	0.07
4936	VERY FINE PRODUCT	LITTLETON	MIDD	2033	CANNED FRUI	0.91	330.60	330.6	18.18		0.00	0.00
24414	WESTFORD ANODIZIN	GRANITEVL	MIDD	3471	PLATNG & PO	0.02	8.09	8.1	0.45		0.08	0.09
							TOTAL	1655.2	91.04	0.299	8.55	9.42
			NANT			0	0	0.0	0	0	0	0
4111	FOXBORO CO.COHASS	FOXBORO	NORF	3471	PLATNG & PO	0.06	20.60	20.6	1.13		0.25	0.27
4120	FOXBORO CO.	FOXBORO	NORF	3471	PLATNG & PO	0.08	27.42	27.4	1.51		0.33	0.36
884	PLYMOUTH RUBB CO.	CANTON	NORF	3069	PLAST.MATER	2.72	994.44	994.4	54.69		12.60	13.89
							TOTAL	1042.5	57.34	0.188	13.18	14.52
3557	BOSTON ED#1 PILGR	PLYMOUTH	PLYM	4911	ELECT.SERVI	428.18	156285.30	0.0	0.00		0.00	0.00
4103	FOXBORO CO.	E.BRIDGEW	PLYM	3625	ELECT.COMPO	0.08	28.95	29.0	1.59		0.63	0.70
21741	WHITMAN PLATING	WHITMAN	PLYM	3471	PLATNG & PO	0.00		0.0	0.00		0.00	0.00
							TOTAL	29.0	1.59	0.005	0.63	0.70
4731	BOSTON EDISON L S	BOSTON	SUFF	4911	ELEC.SERVIC	389.25	142077.45	0.0	0.00		0.00	0.00
4740	BOSTON EDISON MYS	CHARLESTWN	SUFF	4911	ELEC.SERVIC	617.72	225466.40	0.0	0.00		0.00	0.00
							TOTAL	0.0	0.00	0.000	0.00	0.00
3361	AMERIC.OPTICAL CO	S.BRIDGE	WORC	3851	OPHTALMIC G	0.09	33.00	33.0	1.82		0.14	0.16
1538	GUILFORD INDUSTRI	DOUGLAS	WORC	2221	WEAV.FINISH	0.26	94.47	94.5	5.20		0.21	0.23
1350	L.S.STARRETT CO.	ATHOL	WORC	3471	PLATNG & PO	0.07	24.21	24.2	1.33		0.29	0.32
5088	N.ENGLAND PLATING	WORCESTER	WORC	3471	PLATNG & PO	0.21	75.15	75.2	4.13		0.85	0.93
442	NOVACOR CHEMICAL	LEOMINSTR	WORC	2821	PLAST.MATER	0.01	3.68	3.7	0.20		0.06	0.06
469	SEAMAN PAPER CO.	TEMPLETON	WORC	2621	PAPER MILLS	0.73	267.21	267.2	14.70		0.36	0.39
2411	SIMPLEX TIME RECO	GARDNER	WORC	3479	METAL COAT	0.02	6.03	6.0	0.33		0.08	0.09
4171	WORCESTER SPIN.&F	LEICESTER	WORC	2261	FIN.PLAN.CO	0.08	30.06	30.1	1.65		0.06	0.07
4341	WYMAN GORDON CO.	GRAFTON	WORC	3462	IRON&STEEL	0.33	120.39	120.4	6.62		0.42	0.47
							TOTAL	654.2	35.98	0.118	2.47	2.72
					TOTAL			53449.0	2939.70	9.665	136.22	150.16
tsdf90										9.664		

TABLE B.1-4

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tsdfams
     INDUSTRIAL WASTEWATER TREATMENT, STORAGE AND DISPOSAL
        FACILITIES (TSDF'S) VOC EMISSIONS 1990

  2 SCC :   26-40-000-000
          IWW TSDF'S

                                                    * 8.3453 LB/2000 =
    STATE ACTIVITY LEVEL :    53,449,100,000     223024387.12 TONS
                                               TONS
    COUNTY ACTIVITY      VOC   ANNUAL    OZ PO        VOC TPY  VOC PO
    -----  TONS/YR       TPY ACTIVITY    ACTIV         EM.FAC    TPSD
    COUNTI  W.WATER  *.0264 M.GAL/YR  /92*1.2  .0263621LB/TN     /92
    ====== =======   ======  =======  =======      =========  ======
  1 BARNST        0    0.00      0.0        0           0.00   0.000
  2 BERKSH 17288958  227.89   4143.4  5229318         227.89   0.749
  3 BRISTO  6246457   82.33   1497.0  1889339          82.33   0.271
  4 DUKES         0    0.00      0.0        0           0.00   0.000
  5 ESSEX 175945212 2319.14  42166.3 53217401        2319.14   7.625
  6 FRANKL  4219801   55.62   1011.3  1276345          55.62   0.183
  7 HAMPDE        0    0.00      0.0        0           0.00   0.000
  8 HAMPSH  5216647   68.76   1250.2  1577857          68.76   0.226
  9 MIDDLE  6906570   91.04   1655.2  2089001          91.04   0.299
 10 NANTUC        0    0.00      0.0        0           0.00   0.000
 11 NORFOL  4349988   57.34   1042.5  1315722          57.34   0.189
 12 PLYMOU   121007    1.59     29.0    36600           1.59   0.005
 13 SUFFOL        0    0.00      0.0        0           0.00   0.000
 14 WORCES  2729748   35.98    654.2   825655          35.98   0.118

    STATE 223024387 2939.70  53449.1 67457239        2939.70   9.665
                                                 223024387.12 TONS
ACTIVITY LEVEL UNITS :      MILL GALS YR            0.0263621 LB/TON
ACTIVITY LEVEL PROCESS :    PROCESSED               26.362100 LB/T.TON
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK :           7
                                   PO THRUPUT : 30.2 %
WEEKS PER YEAR                52
EMISSION FACTORS :  VOC:      0.0263621 LB     OR 26.362144 LB/T.TON
EMISSION FACTOR UNITS :      LB/TON   VOL.1 3.5.1

RULE EFFECTIVENESS :          N/A
RULE PENETRATION :            N/A
SIP RULE :                    NO

PO INTERVAL :                 1 HR
WEEKDAY:      86%     SAT :   7 %     SUN :      7 %

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)
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Surface Impoundment Modeling Systems (SIMS) - TSDFS

The other methodology utilized for estimating TSDF VOC emissions is the SIMS computer model.[4,5] The only data available from the NPDES report for each TSDF were the industrial flow rate and Standard Industrial Classification (SIC) description. The rest of the input parameters such as surface area and type of treatment were default values used in the SIMS Example Case.

The VOC results were presented in megagrams per year. The conversion factor from megagrams to tons is 1.1023. For example, Crane and Co. with 1.47 megagrams was converted to 1.62 tons. The SIMS VOC results for all the TSDFs are presented in the last two columns of Table B.1-3 in which conversion from megagrams to tons is done for all facilities.

The total SIMS VOC emissions for TSDFs for the state was estimated at 150.16 tons. Because the EPA emission factor estimate of 2,939.70 tons is much higher than the SIMS estimate, the former would be counted in the inventory. A diskette entitled "SIMS Results" comprises the inputs for the TSDFs from which VOC emissions are estimated and was presented for your review with the Draft Inventory Submittal in May 1992.

B.1-iii MUNICIPAL SOLID WASTE LANDFILLS

Introduction

Municipal Solid Waste (MSW) landfills are regulated under Subtitle D of RCRA and generally consist of about 54% of household waste and about 28% of commercial waste. This is a national estimate as presented in Section 3.5.4 of EPA's Procedures Document or Volume 1.[1] VOC emissions are produced from municipal solid waste landfills by three mechanisms: volatilization, chemical reaction and biological decomposition of liquid and solid compounds into other chemical species.

According to Volume 1[1], factors affecting volatilization at MSW landfills include: partial pressure of the constituent, constituent concentration at the liquid-air-interface, temperature, and confining pressure. Chemical reactions are also affected by temperature as well as waste composition, moisture content, and the practice of separate disposal areas for different waste types. Factors affecting biological decomposition are: nutrient and oxygen availability, refuse composition, age of landfill, moisture content, temperature, pH, and waste that is toxic to bacteria.

Volume 1[1] states that the most accurate estimate of VOC emissions from landfills is to conduct field test data together with gas generation rate models. Procedures for estimating landfill air emissions are still being developed by EPA for setting air quality standards for MSW landfills. Because the recommended collection of field test data on landfills is beyond the resources of DEP/DAQC, VOC emissions for Massachusetts have to be calculated using gross emission estimation methodologies as recommended by EPA. The first methodology is the use of an average emissions factor of 13.6 tons VOC per million tons of refuse. This is a gross emissions factor which does not take into consideration the age of landfill waste, pH, refuse type, composition and temperature. The second methodology is the use of a pc emissions model called the Landfill Air Emissions Estimation Model (LAEM)[6] which was developed by EPA's Control Technology Center together with users guides.[7,8]

Landfill Data Collection and Estimation

The landfill solid waste data was obtained from Geri Lambert of DEP's Solid Waste Management Division.[9] Landfill data was presented in a Lotus 123 file with the following parameters: Town, County, Landfill ID, Site Name, Site address, landfill status (whether active, inactive or closed), start year, closure year, and the landfill refuse in tons for the years 1985 to 1990. Table B.1-5 presents the first page for the above landfill parameters and the entire table is presented as Appendix B.1-2 and had to be split into two because of the size of the data. Two Lotus files were used: REF1 from Abington to Montague and REF2 from Montague to end. According to Ms. Lambert the data for refuse tonnage is only reported for as far back as 1985 and that previous years would have to be estimated based on available 1985 to 1990 data. The Division of Solid Waste was created in 1985. The 1985 to 1990 refuse tonnage data for each landfill is presented in Columns 12 to 17 of Table B.1-5.

JUN 4

Landfills which had no closing year were excluded from Table B.1-5. Landfills with a closing year prior to 1985 are included in the table even though they reported no refuse data. The actual open year is presented in Column 5 and the actual close year in Column 6. In order to estimate VOC emissions from the available landfill data, procedures had to be developed to estimate the lifetime and total accumulated refuse for each landfill.

The following is the methodology for estimating total accumulated refuse deposited throughout the lifetime of each landfill until 1990. The basis of this methodology is utilizing the landfills with existing 1985-90 refuse data to extrapolate refuse data for the estimated lifetime of all landfills. This is done even for those landfills which closed prior to 1985 and reported no refuse data but reported a closing date.

The first task is to estimate the average age of each landfill in the state which have a closing year but no opening year. This could only be done by utilizing the landfills which reported open and closed years. The difference between the open and closed years i.e., the age of the landfill is presented in Column 10 of Table B.1-5. Landfills which had no open year and were reported as '0' had an unrealistic age i.e., a landfill which was closed in 1975 would be 1,975 years old. Therefore the unrealistic ages of those landfills with no open year were manually deleted. The average age of those landfills with open and closed years was calculated through Lotus at 26 years. This average was then manually inserted in for those landfills with no open year e.g. Abington as shown in Column 10 of Table B.1-5. Therefore landfills with no open year should have an average lifetime of 26 years, which when subtracted from the close year gives the 'estimated' open year as presented in Column 4. As an example, Abington landfill was closed in 1975 and has an estimated open year of 1949. Column 7 entitled "Current Year" represents the close year and if the landfill is not closed, the year '1990' was typed in because the LAEM model requires a "current year" for which emissions are to be estimated. For example, if the close year is 1993 as in the case of the Adams landfill, the current year would be 1990 so that the emissions would be calculated for the 1990 base year.

The next task was to estimate the total refuse tonnage for the entire lifetime of the landfills. Because 1985 was the earliest year of data available (Column 12), it was used as a base to estimate refuse tonnage for the previous 26 years. The average refuse tonnage for all the landfills for 1985 was estimated at 11,000 tons. Therefore, for those landfills which closed before 1985 and which have no refuse data, the estimated tonnage of 11,000 was applied to their close year as presented in Column 11.

In order to estimate the refuse tonnage for landfills prior to 1985, a discount or negative growth rate was calculated. This discount rate was calculated using the total state landfill tonnage from 1990 back to 1985. The average annual discount rate from 1990 to 1985 was calculated at 4%. Therefore in order to estimate the tonnage from pre-1985 years or years before closure, columns 11 and 12 were combined and multiplied successively by 0.96 to get tonnage for 26 years. For landfills with 1990 data, refuse was calculated for each year from 1984 back to 1964 as shown in Columns 19 to 27.

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For example the estimated refuse for Acton is 12,000 tons (rounded). In the case of Abington (and other closed landfills), the value given in Column 20 would be 2 years prior to closure i.e. 1973. The values for the Columns 28 to 39 or the years 1975 to 1964 are not presented in Table B.1-5 because of the table size in Lotus file 'ref1'. The total accumulated refuse for 1964 to 1984 for open landfills or for the estimated lifetime of the closed landfills is presented in Column 18 and were added to the tonnage for 1985 to 1990 (Columns 11 to 17) to get the total accumulated tonnage up to 1990. The final total accumulated lifetime tonnage up to 1990 is presented in Column 8. For example, the Adams landfill in Berkshire County is estimated for total accumulated tonnage as follows:

Tonnage 1985 to 1990 = 77,000 tons, (Columns 12-17)
Tonnage 1964 to 1984 = 157,829 Tons (Column 18)
Total for 1964 to 1990 = 234,829 Tons (Column 8)

Landfill Emissions Calculations - National Emission Factor Method

This total lifetime refuse tonnage up to 1990 or close year was then applied to the landfill emission factor. The recommended emission factor of 13.6 tons VOC per million tons of landfill was taken from Volume 1.[1] Because Massachusetts had 1990 annual rainfall between 45 to 60 inches[10] and is above the threshold of 23 inches, an additional factor of 2.6 was applied to the emission factor for a final factor of 35.36 tons VOC per million tons of refuse. The VOC calculation for the Barnstable landfill for 1990 is as follows:

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766,098 Tons refuse X 35.36 Tons VOC/10^6 Ton refuse = 27.1 Tons VOC.

The VOC emissions using this national emission factor methodology are presented in Column 9 of Table B.1-5 and the penultimate column in Table B.1-6. The total VOC emissions for the state is estimated at 3,526 TPY or 9.66 TPSD. Landfill emissions are seasonally uniform as given in Table 5.8-1 of Volume 1.[1]

The Landfill Air Emissions Estimation Model (LAEM)

The other methodology for estimating landfill emissions is the use of the Landfill Air Emissions Estimation Model (LAEM) developed by EPA's Control Technology Center with user's guides.[6,7,8]

In order to run the LAEM model the following landfill parameters were needed: Landfill name, open year, current year, design capacity, and total accumulated refuse for current year. The current year is 1990 or the close year for old landfills.

Because the landfill design capacity is unavailable from the DEP Division of Solid Waste[9], it had to be estimated for each operating landfill which would be closing after 1990. In order to do this, the total refuse required to fill the landfill beyond 1990 had to be estimated. This is done in the following formula:
((Total accumulated refuse up to 1990/landfill lifetime) X (close year-current year)) + (total accumulated refuse up to 1990).
For example, the Barnstable landfill (Table B.1-6) is estimated for it's capacity as follows:

((766,098/17) X (1996-1990)) + 766,098 = 1,036,485.5 Tons

The estimated landfill design capacity is similarly calculated for all landfills and are presented in Table B.1-6 and sorted by county. However, the capacity does not affect the VOC emissions.

Although the units required in the LAEM Model are in megagrams of refuse, the units of input are actually in tons and therefore the resulting NMOC emissions are also in tons. The resulting NMOC emissions for each landfill were extracted from LAEM outputs and inserted in the last column of Table B.1-6. (LAEM could only print NMOC emission for each landfill one page at a time, and there was no way to present the emissions for all the landfills in one list).

One problem that arose from this model is estimating emissions for old landfills that closed before 1980. This arose because LAEM estimates projected emissions for only 10 years beyond the current or closed year. For example, the Becket landfill which closed in 1968 would have emissions for the opening year 1942 through 1968 and projected for ten years through 1978.

LAEM2 was designed to estimate emissions up to 50 years after closure. This revised model is used for landfills closed before 1990.

The NMOC landfill emissions are presented by counties in Table B.1-6 using the two methodologies: the national emission factor per refuse and the LAEM model. Because of the size of the Lotus file, the data in Table B.1-6 was split in two files: REF1AM and REF2 and presented as Appendix B.1-2. The towns from Abington to Montague were sorted by counties and presented in REF1AM and the towns from Montague to the end are presented in REF2. Landfill NMOC emissions for both methodologies are presented in Table B.1-6.

The original total landfill emissions for the state using the LAEM model was estimated at 19,855.72 tons for 1990. These LAEM emissions were adjusted by a factor of .923 based on the Radian[11] and EPA AIRS/AMS[12] memoranda. This adjustment factor is the reactive portion of NMOC's estimated from the LAEM model. The adjusted statewide LAEM VOC emissions amount to 18,326.83 Tons. Because Table 5.8-1 of Volume 1[1] presents a uniform seasonal factor for landfills, the emissions were estimated at 50.211 TPSD.

The LAEM VOC emissions were submitted in May and November 1992 which used built-in LAEM default values. Based on the Radian memo,[11] the following LAEM defaults were changed: NMOC concentration from 8,000 ppm to 880 ppm, Methane Generation Constant factor (k) from 0.02 to 0.04 for areas with normal or above rainfall, and the Potential Methane Generation Capacity (Lo) from 8,120 to 4,411.

Using these adjusted LAEM defaults resulted in a drastic reduction of emissions. For example, LAEM with original defaults calculated 173.0 tons NMOC for the Barnstable Landfill. The adjusted LAEM defaults resulted in 17.87 tons NMOC. The adjustment by multiplying by 0.923 resulted in 16.5 tons VOC. The adjusted LAEM emissions are now much lower than the 27.1 tons VOC generated from the National Emission Factor method. The adjusted LAEM calculations for other landfills resulted in similar drastic reductions as shown in Table B.1-6.

The emissions from the National Emission Factor method are therefore counted in the Emissions Inventory because the adjusted LAEM emissions are lower.

Landfill and other Waste Treatment VOC emissions are summarized by county and are presented in Table B.1-9.

TABLE B.1-5

LANDFILL NMOC EMISSIONS 1990

ref1:Abington-Montague

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
TOWN	COUNTY	ID	EST OPEN BASE	ACT OPEN BASE	CLOSE BASE	CURREN YEAR	TOTAL REFUS TONS'90	NMOC TONS 1990	LFIL AGE	EST CLOSE YR TPY	LTPY 1985	LTPY 1986	LTPY 1987	LTPY 1988	LTPY 1989	LTPY 1990	REFUSE 64-84	84 TT	83 TT	82 TT	81 TT	80 TT	79 TT	78 TT	77 TT	76 TT
ABINGTON	PLYMOUTH	SL0001.003	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ACTON	MIDDLESEX	SL0002.003	1962	0	1988	1988	214406	7.58	26		12500	12500	12500	12500	0	0	164406	12	11	11	10	10	9	9	9	8
ACUSHNET	BRISTOL	SL0003.001	1961	0	1987	1987	1372958	48.55	26		85000	85000	85000	0	0	0	1117958	81	78	74	71	68	64	62	59	56
ADAMS	BERKSHIRE	SL0004.001	1966	1966	1993	1990	234829	8.30	27		12000	13000	13000	13000	13000	13000	157829	11	11	10	10	10	9	9	8	8
AGAWAM	HAMPDEN	SL0005.001	1972	0	1998	1990	1892524	66.92	26		100000	100000	117000	117000	117000	26280	1315244	96	91	87	83	79	76	72	69	66
AMESBURY	ESSEX	SL0007.001	1951	0	1977	1977	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
AMESBURY	ESSEX	SL0007.004	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
AMHERST	HAMPSHIRE	SL0008.002	1976	1976	2001	1990	375849	13.29	25		20000	20000	18200	18200	18200	18200	263049	19	18	17	17	16	15	14	14	13
ARLINGTON	MIDDLESEX	SL0010.001	1943	0	1969	1969	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ARLINGTON	MIDDLESEX	SL0010.002	1933	0	1959	1959	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ARLINGTON	MIDDLESEX	SL0010.003	1961	0	1987	1987	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ARLINGTON	MIDDLESEX	SL0010.004	1921	0	1947	1947	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ASHBURNHAM	WORCESTER	SL0011.002	1971	1971	1992	1990	49356	1.75	21		2500	2500	2500	2500	2500	3975	32881	2	2	2	2	2	2	2	2	2
ASHBURNHAM	WORCESTER	SL0011.003	1951	0	1977	1977	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ASHBY	MIDDLESEX	SL0012.002	1973	1973	1991	1990	105338	3.72	18		5500	5500	5500	5500	5500	5500	72338	5	5	5	5	4	4	4	4	4
ASHBY	MIDDLESEX	SL0012.004	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ATHOL	WORCESTER	SL0015.001	1959	1959	1993	1990	143643	5.08	34		7500	7500	7500	7500	7500	7500	98643	7	7	7	6	6	6	5	5	5
ATTLEBORO	BRISTOL	SL0016.001	1967	0	1993	1990	1562953	55.27	26		75000	109000	109000	109000	109000	65520	986433	72	68	65	62	60	57	54	52	50
AUBURN	WORCESTER	SL0017.001	1964	0	1990	1990	274439	9.70	26		16000	16000	16000	16000	0	0	210439	15	15	14	13	13	12	12	11	11
AUBURN	WORCESTER	SL0017.002	1924	0	1950	1950	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
AYER	MIDDLESEX	SL0019.001	1962	0	1988	1988	68610	2.43	26		4000	4000	4000	4000	0	0	52610	4	4	3	3	3	3	3	3	3
AYER	MIDDLESEX	SL0019.004	1963	0	1989	1989	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BARNSTABLE	BARNSTABLE	SL0020.001	1973	1973	1996	1990	766098	27.09	23		40000	40000	40000	40000	40000	40000	526098	38	36	35	33	32	30	29	28	26
BARRE	WORCESTER	SL0021.001	1904	0	1930	1930	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BARRE	WORCESTER	SL0021.002	1973	1973	1993	1990	377143	13.34	20		15500	15500	15500	15500	55640	55640	203863	15	14	14	13	12	12	11	11	10
BECKET	BERKSHIRE	SL0022.001	1942	0	1968	1968	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BELCHERTOW	HAMPSHIRE	SL0024.001	1968	0	1994	1990	95362	3.37	26		5000	5000	4200	4200	4200	7000	65762	5	5	4	4	4	4	4	3	3
BELLINGHAM	NORFOLK	SL0025.002	1964	0	1990	1990	155828	5.51	26		8580	8600	8600	8600	8600	0	112848	8	8	7	7	7	7	6	6	6
BELLINGHAM	NORFOLK	SL0025.003	1947	0	1973	1973	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BELMONT	MIDDLESEX	SL0026.001	1948	0	1974	1974	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BERKLEY	BRISTOL	SL0027.001	1946	0	1972	1972	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BERKLEY	BRISTOL	SL0027.004	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BERLIN	WORCESTER	SL0028.001	1958	0	1984	1984	21229	0.75	26		1500	0	0	0	0	0	19729	1	1	1	1	1	1	1	1	1
BERLIN	WORCESTER	SL0028.002	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BERNARDSTO	FRANKLIN	SL0029.001	1955	1955	1992	1990	18352	0.65	37		1000	1000	800	800	800	800	13152	1	1	1	1	1	1	1	1	1
BEVERLY	ESSEX	SL0030.004	1960	0	1986	1986	500031	17.68	26		33000	33000	0	0	0	0	434031	32	30	29	27	26	25	24	23	22
BILLERICA	MIDDLESEX	SL0031.006	1961	0	1987	1987	4727562	167.17	26		312000	312000	0	0	0	0	4103562	298	285	272	260	248	237	226	216	206
BLACKSTONE	WORCESTER	SL0032.001	1972	1972	1996	1990	86186	3.05	24		4500	4500	4500	4500	4500	4500	59186	4	4	4	4	4	3	3	3	3
BLACKSTONE	WORCESTER	SL0032.002	1947	0	1973	1973	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BOLTON	WORCESTER	SL0034.001	1968	1968	1998	1990	30644	1.08	30		1600	1600	1600	1600	1600	1600	21044	2	1	1	1	1	1	1	1	1
BOLTON	WORCESTER	SL0034.002	1945	0	1971	1971	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BOSTON	SUFFOLK	SL0035.005	1960	0	1986	1986	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BOURNE	BARNSTABLE	SL0036.003	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7

See Appendix Table B.1-3 for rest of Landfill Data

TABLE B.1-6 *

LANDFILL NMOC EMISSIONS 1990 BY EMISSION FACTOR AND LANDFILL MODEL (LAEM) SORTED BY COUNTIES

```
                                                        VOL.1 June June
ref1AM revised 6/2/93                                      EF 1993 1993
ref1:Abington-Montague                   ESTIM     1990 35.36 LAEM LAEM
disk: WASTE MGT     EST  ACT  ACT CURR/ DESIGN    TOTAL  NMOC NMOC  VOC
                   OPEN OPEN CLOSE CLOS CAPCTY    REFUS  TONS TONS TONS
TOWN   COU    ID   BASE BASE BASE YEAR    TONS     TONS  1990 1990 1990
========== ============ ==== ===== ==== ======= ======== ===== ====*.923
BARNSTABARSL0020.0 1973 1973 1996 1990 1036485   766098  27.1 17.9 16.5
BOURNE BARSL0036.0 1962    0 1988 1988  155677   155677   5.5  3.2  3.0
BOURNE BARSL0036.0 1968 1968 2000 1990  409033   281210   9.9  6.0  5.5
BREWSTEBARSL0041.0 1982    0 2008 1990  404595   124491   4.4  3.4  3.2
CHATHAMBARSL0055.0 1977 1977 1995 1990  164416   118745   4.2  3.0  2.8
DENNIS BARSL0075.0 1957 1957 1998 1990  333136   268134   9.5  4.8  4.4
EASTHAMBARSL0086.0 1967    0 1993 1990  206730   182877   6.5  3.8  3.5
FALMOUTBARSL0096.0 1974 1974 2001 1990  921113   545845  19.3 13.0 12.0
HARWICHBARSL0126.0 1967 1967 2003 1990  254811   162796   5.8  3.4  3.2
MASHPEEBARSL0172.0 1975    0 2001 1990  182587   105338   3.7  2.6  2.4
       TOTAL                                    2711211  95.9 61.1 56.4
ADAMS  BERSL0004.0 1966 1966 1993 1990  264183   234829   8.3  4.9  4.5
BECKET BERSL0022.0 1942    0 1968 1968  155677   155677   5.5  1.3  1.2
CHESHIRBERSL0058.0 1950    0 1976 1976  155677   155677   5.5  1.8  1.6
EGREMONBERSL0090.0 1962    0 1988 1988   34305    34305   1.2  0.6  0.6
GREAT BBERSL0113.0 1975 1975 1993 1990  258812   215677   7.6  5.2  4.8
LEE    BERSL0150.0 1965    0 1991 1990  359504   345677  12.2  7.0  6.5
LEE    BERSL0150.0 1965    0 1991 1990  145749   140143   5.0  2.9  2.6
LEE    BERSL0150.0 1969    0 1995 1990     474      383   0.0  0.0  0.0
       TOTAL                                    1282368  45.3 23.7 21.8
ACUSHNEBRISL0003.0 1961    0 1987 1987 1372958  1372958  48.5 26.1 24.1
ATTLEBOBRISL0016.0 1967    0 1993 1990 1766817  1562953  55.3 32.9 30.3
BERKLEYBRISL0027.0 1946    0 1972 1972  155677   155677   5.5  1.5  1.4
BERKLEYBRISL0027.0 1944    0 1970 1970  155677   155677   5.5  1.4  1.3
DARTMOUBRISL0072.0 1966    0 1992 1990  418761   386549  13.7  8.0  7.4
DIGHTONBRISL0076.0 1944    0 1970 1970  155677   155677   5.5  1.4  1.3
DIGHTONBRISL0076.0 1969    0 1995 1990   47425    38305   1.4  0.8  0.8
EASTON BRISL0088.0 1946    0 1972 1972  155677   155677   5.5  1.5  1.4
EASTON BRISL0088.0 1970    0 1996 1990  211634   162796   5.8  3.6  3.3
FAIRHAVBRISL0094.0 1972 1972 2011 1990  663951   306439  10.8  7.0  6.5
FALL RIBRISL0095.0 1942    0 1968 1968  155677   155677   5.5  1.3  1.2
FALL RIBRISL0095.0 1938 1938 1997 1990 5046677  4447918 157.3 60.2 55.5
FREETOWBRISL0102.0 1969    0 1995 1990  137942   111415   3.9  2.4  2.2
MANSFIEBRISL0167.0 1961    0 1987 1987  161524   161524   5.7  2.9  2.6
       TOTAL                                    9329241 329.9  151  139
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* THIS IS THE 1ST PAGE OF APPENDIX B.1-4

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TABLE B.1-7

LANDFILL NMOC EMISSIONS 1990
NATIONAL EMISSION FACTOR METHODOLOGY (VOL.1)
TONS PER YEAR (TPY) AND TONS PER SUMMER DAY (TPSD)

lfcty90
June 4 93

		REF1	REF2	TOTAL	
	COUNTY	EM.FAC1 TPY	EM.FAC2 TPY	EM.FAC TPY	TPSD
1	BARNSTABLE	95.87	40.04	135.91	0.37
2	BERKSHIRE	45.34	47.22	92.56	0.25
3	BRISTOL	329.88	170.57	500.45	1.37
4	DUKES	8.08	3.86	11.94	0.03
5	ESSEX	169.87	138.68	308.55	0.85
6	FRANKLIN	31.87	9.32	41.19	0.11
7	HAMPDEN	327.13	78.82	405.95	1.11
8	HAMPSHIRE	106.31	69.50	175.81	0.48
9	MIDDLESEX	368.50	161.92	530.42	1.45
10	NANTUCKET	0.00	8.23	8.23	0.02
11	NORFOLK	99.79	333.25	433.04	1.19
12	PLYMOUTH	316.90	107.39	424.29	1.16
13	SUFFOLK	11.01	0.00	11.01	0.03
14	WORCESTER	176.57	270.02	446.59	1.22
	STATE	2087.12	1438.82	3525.94	9.66

TABLE B.1-8

3landfams

MUNICIPAL SOLID WASTE LANDFILLS EMISSIONS 1990

JUNE 3 93 COMPOSITE EMISSION FACTOR USED FOR AMS INPUT

SCC : 26-20-030-000
MSW LANDFILLS

STATE ACTIVITY LEVEL : 99,716,000 TONS LIFETIME REFUSE

	COUNTY ACTIVITY LEVEL : COUNTIES	ANNUAL ACTIVITY 10 TONS REF	OZ PO ACTIV /365*92	VOC TPY EF 35.36 LB/M.TON	VOC PO TPSD /92
1	BARNSTABLE	3843671	968816	135.91	0.372
2	BERKSHIRE	2617817	659833	92.57	0.254
3	BRISTOL	14153045	3567343	500.45	1.371
4	DUKES	337658	85108	11.94	0.033
5	ESSEX	8726102	2199456	308.55	0.845
6	FRANKLIN	1164920	293624	41.19	0.113
7	HAMPDEN	11480477	2893709	405.95	1.112
8	HAMPSHIRE	4972246	1253278	175.82	0.482
9	MIDDLESEX	15000370	3780915	530.41	1.453
10	NANTUCKET	232829	58686	8.23	0.023
11	NORFOLK	12246596	3086813	433.04	1.186
12	PLYMOUTH	11999040	3024416	424.29	1.162
13	SUFFOLK	311354	78478	11.01	0.030
14	WORCESTER	12629875	3183421	446.59	1.224
	STATE	99716000	25133896	3525.96 3525.96	9.660

ACTIVITY LEVEL UNITS : TONS (LIFETIME)
ACTIVITY LEVEL PROCESS : TRANSFERRED OR STORED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 0.07072
EMISSION FACTOR UNITS : LB/TON (VOLUME 1 EM.FACTOR 35.36 TON VOC / M.TON LANDFILL)

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO
PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)
ACTIVITY AND EMISSION FACTORS ADJUSTED FOR AMS INPUT

TABLE B.1-9

wastecty3
June 3 93

TOTAL WASTE MANAGEMENT VOC EMISSIONS 1990
TONS PER YEAR (TPY) AND SUMMER DAY (TPSD)

	COUNTIES	POTW TPY	POTW TPSD	TSDF TPY	TSDF TPSD	(VOL.1 EF) LANDFILL TPY	(VOL.1 EF) LANDFILL TPSD	TOTAL WASTE VOC EM TPY	TOTAL WASTE VOC EMIS TPSD
1	BARNSTABLE	2.93	0.011	0.00	0.000	135.91	0.372	138.84	0.383
2	BERKSHIRE	47.12	0.181	227.89	0.749	92.56	0.254	367.57	1.184
3	BRISTOL	94.17	0.361	82.33	0.271	500.45	1.371	676.95	2.003
4	DUKES	0.00	0.000	0.00	0.000	11.94	0.033	11.94	0.033
5	ESSEX	115.07	0.441	2319.14	7.625	308.55	0.845	2742.76	8.911
6	FRANKLIN	23.64	0.091	55.62	0.183	41.19	0.113	120.45	0.387
7	HAMPDEN	331.18	1.270	68.76	0.226	405.95	1.112	805.89	2.608
8	HAMPSHIRE	70.49	0.270	0.00	0.000	175.81	0.482	246.3	0.752
9	MIDDLESEX	79.96	0.307	91.04	0.299	530.42	1.453	701.42	2.059
10	NANTUCKET	0.04	0.000	0.00	0.000	8.23	0.023	8.27	0.023
11	NORFOLK	9.72	0.037	57.34	0.188	433.04	1.186	500.1	1.411
12	PLYMOUTH	44.27	0.170	1.59	0.005	424.29	1.162	470.15	1.337
13	SUFFOLK	0.00	0.000	0.00	0.000	11.01	0.030	11.01	0.030
14	WORCESTER	146.19	0.561	35.98	0.118	446.59	1.224	628.76	1.903
	STATE	964.78	3.700	2939.69	9.664	3525.94	9.660	7430.41	23.024

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REFERENCES FOR WASTE TREATMEMT

1) Procedures for the Preparation of Emission Inventories for CO and Precursors of Ozone. Volume 1: General Guidance for Stationary Sources. EPA.450/4-91-016

2) Department of Environmental Protection, Bureau of Waste Prevention, Industrial Wastewater Management Program, Gene Romero and Peter Dore - Industrial Wastewater Flow Rates to POTWs, November 1991.

3) Permit Compliance Systems, Effluent Discharge Mass Loading Report, Geographical Listing by Facility, CO Report: Mass Major Municipal Facilities (POTW's) and Major Facilities except POTW's (TSDFS) for 1990. Ed Kim NPDES Program Operations Section, US EPA Region I, Boston.

4) Surface Impoundment Modeling Systems (SIMS) Version 2.0, Users Manual, EPA 450/4-90-019a, EPA RTP NC, September 1990.

5) Background Document for Surface Impoundment Modeling Systems (SIMS) Version 2.0, EPA 450/4-90-019b, EPA RTP NC September 1990.

6) Landfill Air Emissions Estimation Model, Versions 1.1 and 2.0 (Software), EPA 600/8-90-085B (Revised) EPA RTP NC April 1991 and 1992.

7) Landfill Air Emissions Estimation Model from Municipal Landfills - Users Annual, EPA 600/8-90-085A. EPA RTP NC Dec 1990.

8) Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Guidelines. EPA - OAQPS RTP NC EPA 450/3-90-011a. March 1991.

9) Department of Environmental Protection, Bureau of Waste Prevention, Division of Solid Waste Management. Solid Waste Facility listings in Massachusetts 1985 to 1990.

10) Climatological Data Annual Summary - New England 1990, Monthly Precipitation, Vol. 102 #13. US Department of Commerce National Climatic Data Center, National Oceanic and Atmospheric Adminstration ISSN0364-5339 Ashville, NC

11) Memorandum from Lucy Adams, Radian Corporation, to SIP Inventory Preparers and EPA Regions, "Using the Landfill Model for VOC Estimates," April 15 1992.

12) EPA Emission Inventory Questions and Answers on AIRS/AMS Training Sessions 7/92 - 9/92.

13) EPA Comments on Draft Inventory September 1 1992.

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B.2 GASOLINE DISTRIBUTION LOSSES

Evaporative emissions occur at all stages in the gasoline distributive process. Gasoline operations generally inventoried as area sources are gasoline dispensing outlets and tank trucks in transit. Bulk terminals and bulk plants, which are intermediate distributive points between refineries and outlets, are usually inventoried as point sources.

VOC emissions from gasoline dispensing outlets result from vapor losses during the following processes: a) tank truck unloading into underground tanks (Stage I) b) vehicle fueling (Stage II) c) underground tank breathing d) tank trucks in transit and e) aircraft refueling. According to Volume 1[7] evaporative losses from vehicle fueling including spillage should be determined with Mobile 4.1 model which calculates emissions more accurately using inputs for RVP and temperature.

Gasoline Sales

The most appropriate approach for determining VOC emissions from gasoline distribution is through gasoline sales or usage which are applied to appropriate emission factors for each process as recommended in EPA's Procedures for Inventory Preparation herein referred to as Volume 1[7]. Massachusetts gasoline sales figures were collected from the Massachusetts Department of Revenue[9] which recorded sales of 2,404,777,794 gallons in 1990. The U.S. Department of Transportation, Federal Highway Administration[4]

"Highway Statistics" Table MF-33GA[4] estimated the 1990 gasoline usage at 2,432,912,000 gals. According to Volume 1, one distinct advantage of using data in FHWA "Highway Statistics" is that gasoline sales are tabulated by month which facilitates a seasonal adjustment of the gasoline station emission total. The "Highway Statistics" gasoline data will therefore be used for this portion of the Area Source Inventory.

The procedure for calculating VOC emissions from gasoline distribution is to apply the gasoline sales to the appropriate emission factors and adjust for rule effectiveness (RE).[6] RE is applied to categories which are under regulatory control. The emissions are then seasonally adjusted for a typical ozone or summer day. The formula for the Gasoline Distribution categories is as follows:

Uncontrolled Emissions = Gasoline sales X emission factor X seasonal adjustment/activity days per year.

The formula for applying Rule Effectiveness (RE)[6] including Control Efficiency (CE) and Rule Penetration (RP)is:

Emissions = Uncontr. Emissions X [1- (Control eff.) (RE)(RP)].

B.2-1 TANK TRUCK UNLOADING (STAGE I)

VOC emissions from tank truck unloading are determined by the type of filling method at the service station. The three methods are: splash, submerged and balanced (submerged with vapor recovery system). According to the Massachusetts regulation 310 CMR 7.24[2] which took effect July 1, 1980, all stationary service station tanks with a capacity between 250 to 40,000 gallons must have submerged fill, and those above a capacity of 2,000 gallons must install a Stage I vapor recovery system with a control efficiency of at least 90% of the gasoline vapors. The Massachusetts DEP Stage II Background Document[10] has a service station cut-off point of 20,000 gallons throughput per month. It was estimated from this document that 3.24% of the stations were below that throughput and are exempt from the regulation. This percentage will also be used as an estimate for exempting stations from the Stage 1 regulation.

The emission factor for submerged fill as given in AP-42 T.4-4-7 is 7.3 lb/10^3 gal. In applying the RE formula, the vapor recovery system is estimated at 90% control efficiency, and rule effectiveness is the national default of 80%.

Installation of a Stage 1 vapor recovery system does not apply to the Berkshire region[10] which receives most of its gasoline from Albany, New York. Telephone interviews with the major gasoline distributors in Berkshire and Albany, N.Y.[12] confirmed that almost all the service stations in Berkshire are designed for the "drop-tube' or submerged fill method. Some Berkshire stations are also beginning to use the vapor recovery system. A spokesman for the Mobile Oil Corp. said that the splash method has been phased out over the last few years primarily for fire safety measures and that it may exist in very small stations and may account for less than 5% of the Berkshire distribution.[12] Gasoline distribution were apportioned to counties based on vehicle registration distribution obtained from the R.J. Polk data for 1990[13] and are presented in Table B.2-1. The following is the calculation for VOC emissions from Stage I:

Summer Adjustment

The gasoline sales for the summer months of June, July and August were taken from Highway Statistics[4] and are presented in Table B.2-2. The summer gasoline sales amounted to 646,991,000 gallons or 26.59% of the annual total. The summer months or peak ozone season covers June to August at 13 weeks or 92 days. For activities at 6 days per week, the ozone season covers 13 X 6 at 78 days.

Massachusetts gasoline sales = 2,432,912,000 gallons

Berkshire County = 2.42% of Vehicle Registrations = 58,876,647 gallons

Emission Factors: AP-42 T.4.4-7[5]

5% splash fill = 2,943,832 gals X 11.5 $lb/10^3$ gal = 16.93 TPY

16.93 X .266/78 = 0.058 TPSD (Table B.2-3)

95% submerged fill = 55,932,815 gals X 7.3 $lb/10^3$ gal = 204.15 TPY

204.15 X .266/78 = 0.696 TPSD

Berkshire Total = 221.08 TPY

.058 TPSD + 0.696 TPSD = 0.754 TPSD

Rest of State 2,432,912,000 - 58,876,647 = 2,374,035,353 gallons

Emission Factor: AP-42 T.4.4-7-Submerged fill

3.24% under 2,000 gals = 76,918,745 X 7.3 $lb/10^3$ = 280.75 TPY

280.75 X .266/78 = 0.957 TPSD

Balanced submerged fill = Submerged fill applied to RE, CE and RP

96.76% over 2,000 gals = 2,297,116,608 X 7.3 $lb/10^3$ = 8,384.48 TPY

Vapor recovery system control efficiency = 90%, RE = 80%, RP = 100%

Rule effectiveness: 8,384.48 X [1-(.9) (.8)(1.0)] = 2,347.65 TPY

2,347.65 X .266/78 = 8.006 TPSD (Table 6.2-5)

Rest of State Total = 280.75 + 2,347.65 = 2,628.40 TPY

0.957 TPSD + 8.006 TPSD = 8.963 TPSD

Statewide Total = 2,628.40 + 221.08 (Berkshire) = 2,849.48 TPSD

8.963 TPSD + 0.754 TPSD = 9.717 TPSD

Stage 1 Emissions are presented by county and are adjusted for AMS input in Tables B.2-4 and B.2-5. Stage 1 emissions are summarized by county in Table B.2-8.

B.2-ii VEHICLE FUELING (STAGE II)

Evaporative losses from vehicle fueling or Stage II, including spillage are determined by two methods: multiplying gasoline throughput by the appropriate emission factors and utilizing Mobile 4.1. EPA recommends in Section 4.2-2.2 of Volume 1[7] that Stage II emissions should be estimated using Mobile 4.1 which incorporates RVP and temperature. Stage II emissions will not be presented here in the Area Source Section.

B.2-iii UNDERGROUND TANK BREATHING

The same gasoline sales figure as used for Stage I is applied to the appropriate emission factor for calculating VOC emissions from underground gasoline storage tanks:

Emission Factor (AP-42 T.4.4-7) = 1.0 lb/10^3 gal

2,432,912,000 gals. X 1.0 lbs/10^3 = 1,216.46 TPY

The summer day adjustment is the same methodology done for Stage I. 1,216.46 TPY X 26.59% = 323.46 Tons per Summer/92 days = 3.516 TPSD VOC emissions are apportioned to counties and adjusted for AMS input in Table B.2-6.

B.2.iv TANK TRUCKS IN TRANSIT

Evaporative losses from tank trucks in transit are caused by leaking delivery trucks and temperature/pressure changes. Emissions occur under two modes of transfer: 1) trucks loaded with fuel and 2) tanks returning with vapor. Emission factors for both modes are given in AP-42[5] Table 4.4-2 and Volume 1 suggests that they should be combined into a composite emissions factor. An average of the extreme and typical values was used and calculated at 0.1425 lbs/10^3 gallons. The presence of bulk plants account for 25% of the national distribution but in this state it was estimated in the 1982 SIP[11] to be 5% of the distribution of gasoline. Because Massachusetts is one of the smallest states in the country there is very little need for the intermediary transfer of gasoline (bulk plants) between terminals and gas stations. According to Volume 1[7] the presence of bulk plants would require additional distribution of gasoline i.e., gasoline must be distributed twice, once from terminals to bulk plants and once from bulk plants to gas stations. Therefore, 5% must be added to total gasoline distribution. The VOC emission calculations are as follows:

Emission Factor - AP-42 T.4.4-5.

Loaded - typical - 0 to 0.01 Average = 0.005
- extreme - 0 to 0.08 Average = 0.04
Comp. Average = 0.0225
Unloaded - typical - 0 to 0.11 Average = 0.055
- extreme - 0 to 0.37 Average = 0.185
Comp. Average = 0.120
Composite TOTAL = 0.1425

Gasoline sales = 2,432,912,000 gals. X 1.05 = 2,554,557,600 gals. transferred.

2,554,557,600 gals X 0.1425 lbs/10^3 gals. = 182.01 Tons VOC

Summer day Adjustment

182.01 TPY X 26.59% = 48.23 Tons per Summer/78 days = 0.621 TPSD

County emissions for Transit Losses are adjusted for AMS input in Table B.2-7.

Gasoline Distribution VOC emissions are summarized in Table B.2-8 and amounts to 2,849.47 TPY or 9.717 TPSD.

B.2-v AIRCRAFT REFUELING

Aircraft refueling is a recent category in the Area Source VOC emissions inventory. Emissions occur when vapor laden air in a partially empty aircraft fuel tank is displaced to the atmosphere when the tank is refilled. According to Volume 1[7] the quantity of vapor displaced depends on the fuel temperature, fuel vapor pressure, aircraft fuel tank temperature and fuel dispensing rate. Commercial and general aviation aircraft primarily consume jet kerosene and aviation gasoline. Military aircraft consume primarily jet naphtha.

VOC emissions from aircraft refueling is estimated using fuel sales data by fuel type and multiplying by appropriate emission factors. State aircraft fuel data was obtained from Table 48 of the Department of Energy Petroleum Marketing Annual 1990.[3] The emission factors for the three fuel types were developed using the following formula from Volume 1[7]:

$$\text{Emission Factor lb}/10^3\text{ gal} = \frac{12.46 * S * P * M}{\text{Temperature }^\circ\text{R}}$$

Where S = Saturation Factor of 1.45 (Table 4.4-1 of AP-42)[5]

P = Fuel True Vapor Pressure (Table 4.3-2 of AP-42)

M = Fuel Molecular Weight in lb/lb mol (Table 4.3-2 of AP-42)

The following is the calculation for P or fuel true vapor pressure as given in Table 4.3-2 of AP-42. The temperature used for this calculation is the average maximum temperature of 94.4°F which was used for the Mobile 4.1 model in the Highway Mobile Source Section.

	P-True Vapor Pressure at @ 95°F	Molecular Weight @ 60°F.
Jet Kerosene	0.025	130
Jet Naphtha	2.55	80
Aviation Gasoline	6.80	68

The true vapor pressure was given in AP-42 Table 4.3-2 for 80°F, 90°F, and 100°F. The true vapor pressure (P) for the three fuels were calculated for 95°F. The Reid Vapor Pressure (RVP) for aviation gasoline was given for 7, 10 and 13 RVP and 'P' was calculated for 7 RVP. The American Society for Testing and Materials (ASTM)[14] was contacted and a range of 5.5 to 7.0 RVP was given for aviation gasoline with an ASTM Class of D910. The ASTM class was obtained from the glossary section of the 1990 Petroleum Marketing Annual.[3]

The following is the VOC emission factor calculation for Aircraft Refueling:

Jet Kerosene: =

$$\frac{12.46 \times 1.45 \times 0.025 \times 130}{94.4 + 460} = \frac{58.72}{554.4} = 0.1059 \text{ lb}/10^3 \text{ gal.}$$

351,392 10^3 gal X 0.1059 lb/10^3 gal = 37,212.4 lb/2,000 lbs. = 18.61 tons VOC

Jet Naphtha =

$$\frac{12.46 \times 1.45 \times 2.55 \times 80}{554.4} = \frac{3685.69}{554.4} = 6.648 \text{ lb}/10^3 \text{ gal}$$

15,178 10^3 gal X 6.648 lb/10^3 = 100,903.3 lb/2,000 lbs = 50.45 tons VOC

Aviation Gasoline = $\frac{12.46 \times 1.45 \times 6.8 \times 68}{554.4} = \frac{8,354.2}{554.4} = 15.069$ lb/10^3 gal

3,886 10^3 gal X 15.069 lb/10^3 gal = 58,557.6 lb/2,000 lbs = 29.28 tons VOC

Total Aircraft Refueling Emissions = 98.34 tons VOC

The fuel usage for Jet Naphtha which is used mainly by military aircraft was withheld in Table 48 of the Petroleum Marketing Annual for Massachusetts and New England. The jet naphtha usage for Massachusetts therefore had to be estimated from the national estimate which was given at 2,447,745 10^3 gal. In order to apportion this national estimate to

Massachusetts, the total military operations for Massachusetts given in Table 9 of the 1990 Federal Air Traffic Activity[15] was calculated to 0.62% of the national national military operations.

In order to facilitate input of Aircraft refueling into the AMS system, EPA's guidance in a memorandum of September 22, 1992[17] was utilized. This memorandum advice is to develop a composite emission factor for this section under SCC 22-75-900-101.

Jet Kerosene	351,392 10^3 gal	X 0.1059 lb VOC/10^3 gal	= 18.61 TPY
Jet Naphta	15,178 10^3 gal	X 6.648 lb VOC/10^3 gal	= 50.45 TPY
Aviat. Gasoline	3,886 10^3 gal	X 15.069 lb VOC/10^3 gal	= 29.28 TPY
TOTAL	370,456 10^3 gal		= 98.34 TPY

Composite emission factor = 98.34/370,456 = 0.531 lb VOC/10^3 gal

Massport in their comments for the July 1993 Public Hearing for this Inventory presented their emissions for this category for Logan Airport. Because Massport's methodology is much more detailed and they used their own local data, their emissions will be accepted for this inventory. Massport estimated Aircraft refueling and other fuel handling at 160 tpy VOC. This will replace the total of 79.49 that was originally estimated for Logan Airport.

Aircraft VOC refueling emissions are presented monthly in Table B.2-9. The 1990 estimate for VOC emissions was 98.34 TPY and is now revised to 178.87 tpy or 0.49 TPSD. Emissions were apportioned to counties based on total operations given in FAA Air Traffic Activity [15] and are presented in Table B.2-10 for AMS input. Table B.2-10 utilizes a composite emission factor of .531 lb VOC/10^3 gal in order to facilitate

AMS input. Logan's activity factor would be adjusted to reflect Massport's emissions for Logan Airport.

B.2-vi PETROLEUM VESSEL LOADING AND UNLOADING

Evaporative VOC emissions from ocean going ships and barges carrying petroleum liquids result from loading and unloading losses, ballasting losses and transit losses. Loading losses according to Volume 1[7] are the primary source of evaporative emissions from marine vessel operations. Loading loss does not apply to Massachusetts because of the absence of refineries hence most gasoline vessel losses would be involved in the unloading of ships and barges. Ballasting losses are also a source of evaporative VOC emissions associated with unloading petroleum liquids at marine terminals. Ballasting VOC emissions are generated from the empty cargo tanks when the vapors are displaced to the atmosphere as the cargo tank is loaded with sea water. In addition, evaporative VOC emissions also occur while the cargo is in transit, similar to breathing losses associated with petroleum storage.

The data for the amount of fuel unloaded from vessels from each port in the state was obtained from the Waterborne Commerce of the United States.[16] The latest year of data is 1989 and the 1990 report should be released by September 1992. The New England Section of this report presented freight traffic for each port in short tons for the following petroleum fuels: gasoline, jet fuel, kerosene, distillate oil, residual oil, naphtha, crude oil and petroleum products.

The petroleum freight in short tons were converted to gallons using the product density of each fuel given in AP-42 Table 4.3-2. The conversion factor in AP-42 is given in pounds per gallons and the inverse of this conversion factor was used to convert from short tons to pounds to gallons as presented in Table B.2-12. Appropriate emission factors for the fuels are also presented in this table.

The following is the procedure for estimating 1989 VOC emissions for gasoline vessel unloading for Norfolk County as presented in Table B.2-11:

659,015 tons gasoline X 2,000 lbs. X 1/5.6 density gal/lb X
EF 1.8 lb/10^3 gal /2,000 lbs. = 211.82 tons

The same procedure was done for other petroleum fuels for Norfolk County which together amounted to 212.5 tons VOC for 1989. The emissions for all counties for all fuels using the same procedure as Norfolk amounted to a Statewide total of 5,248.2 tons for 1989.

The next step was to adjust the 1989 emissions to base year 1990 using a growth factor. Because the Waterborne Commerce[16] latest publication is for 1989, another fuel use publication with 1989 and 1990 data was used. Since gasoline is the major fuel unloaded at marine terminals, the 1989 and 1990 gasoline usage was taken from Highway Statistics Table MF-33GA[4]. This 1990 data was used for gasoline distribution VOC estimation. The 1989 usage of 2,520,043 10^3 gal compared with the 1990 usage of 2,432,912 10^3 gal gives a growth factor of 0.9654. The growth factor of 0.9654 was applied to the state 1989 total 5,248.23 tons VOC for a total of 5,066.64 tons for 1990 as presented in Table B.2-11.

The 1990 VOC emissions were then adjusted for a typical summer day

as presented in the last column of Table B.2-14. Monthly fuel sales of kerosene, residual and distillate oil and motor gasoline for the state were obtained from Tables 47 to 49 of the 1990 Petroleum Marketing Annual.[3] The summer adjustment factor of 0.8746 was calculated as shown in Table B.2-13. VOC emissions for a typical summer day are calculated using a composite emission factor of 0.2549 lb/ton fuel and is presented in Table B.2-14 and is calculated as follows:

5,066.64 tons/365 days X 0.8746 = 13.881 TPSD

In order to facilitate AMS data entry, the activity factor in tons was converted to thousand gallons. AP42-T.4.3-2 presents product density for petroleum products for an average of 6.54 lb per gallon i.e. 1 lb = .1529 gallons. This amounted to a total statewide 12,156,914 thousand gallons compared to 5,066.64 Tons VOC given an emission factor of 0.833552 lb per thousand gallons. This conversion is presented in Table B.2-15.

Total Gasoline Distribution emissions are for all source categories in this section and are summarized by counties in Table B.2-17. Total VOC emissions amount to 9,493.49 TPY and 28.225 TPSD.

TABLE B.2-1

MASSACHUSETTS POPULATION AND VEHICLE REGISTRATION 1990

	COUNT	POP 1990	% COUNTY	1990 DOM CARS	1990 TRUCKS	1990 FOR IMP	1990 TOT VEH	COUNTY PERCENT
1	BARNS	186,605	3.10%	126,972	43,878	43,736	170,850	3.79%
2	BERKS	139,352	2.32%	80,324	28,920	23,163	109,244	2.42%
3	BRIST	506,325	8.42%	310,814	81,517	86,944	392,331	8.69%
4	DUKES	11,639	0.19%	7,924	5,174	3,547	13,098	0.29%
5	ESSEX	670,080	11.14%	414,292	95,957	137,454	510,249	11.30%
6	FRANK	70,092	1.17%	40,938	16,396	14,012	57,334	1.27%
7	HAMPD	456,310	7.58%	279,146	68,092	66,823	347,238	7.69%
8	HAMPS	146,568	2.44%	79,875	25,906	28,971	105,781	2.34%
9	MIDDL	1,398,468	23.24%	878,212	183,371	320,730	1,061,583	23.52%
10	NANTU	6,012	0.10%	3,633	3,870	1,638	7,503	0.17%
11	NORFO	616,087	10.24%	386,778	87,725	129,256	474,503	10.51%
12	PLYMO	435,276	7.23%	260,424	82,474	72,471	342,898	7.60%
13	SUFFO	663,906	11.03%	321,019	52,095	110,483	373,114	8.27%
14	WORCE	709,705	11.30%	421,966	126,080	110,885	548,046	12.14%
	STATE	6,016,425	1.0	3,612,317	901,455	1,150,113	4,513,772	100.00%

Source: US Census
RJ POLK

TABLE B.2-2

MONTHLY GASOLINE SALES IN MASSACHUSETTS 1990

	MONTH	SALES		
	JANUARY	192321		
	FEBRUARY	180840		
	MARCH	208123		
	APRIL	196044		
	MAY	212527		
*	JUNE	213975		
*	JULY	191726		
*	AUGUST	241290	SUMMER %	26.59%
	SEPTEMBER	193792		
	OCTOBER	204380		
	NOVEMBER	199030		
	DECEMBER	198864		
	TOTAL	2432912		

Source: Highway Statistics 1990

file: pop90

TABLE B.2-3

splasham

GASOLINE DISTRIBUTION STAGE 1 SPLASH FILL
VOC EMISSIONS 1990

4 SCC : 25-01-060-052
STAGE 1 SPLASH FILL

BERKSHIRE COUNTY ONLY 2,943.8 THOUSAND GALLONS

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV *.266	VOC TPY EM.FAC 11.5LB/T.GL	VOC PO TPSD /78
1	BARNSTABLE	186605	3.1%				
2	BERKSHIRE	139352	2.3%	2943.8	783	16.93	0.058
3	BRISTOL	506325	8.4%		0	0.00	0.000
4	DUKES	11639	0.2%		0	0.00	0.000
5	ESSEX	670080	11.1%		0	0.00	0.000
6	FRANKLIN	70092	1.2%		0	0.00	0.000
7	HAMPDEN	456310	7.6%		0	0.00	0.000
8	HAMPSHIRE	146568	2.4%		0	0.00	0.000
9	MIDDLESEX	1398468	23.2%		0	0.00	0.000
10	NANTUCKET	6012	0.1%		0	0.00	0.000
11	NORFOLK	616087	10.2%		0	0.00	0.000
12	PLYMOUTH	435276	7.2%		0	0.00	0.000
13	SUFFOLK	663906	11.0%		0	0.00	0.000
14	WORCESTER	709705	11.8%		0	0.00	0.000
	STATE	6016425	100.0%	2943.8	783	16.93	0.058

ACTIVITY LEVEL UNITS : TH.GALLS YR
ACTIVITY LEVEL PROCESS : THRUPUT
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : 13 PO THRUPUT : 26.6 %

EMISSION FACTORS : VOC: 11.5 LB
EMISSION FACTOR UNITS : LB/T.GAL AP-42 T.4.4-7

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 83% SAT : 17% SUN : 0%

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.2-4

statst1

GASOLINE DISTRIBUTION SUBMERGED FILL
VOC EMISSIONS 1990

SCC : 25-01-060-051
SUBMERGED FILL

STATEWIDE ACTIVITY 132,852.7 THOUSAND GALLONS

	COUNTY ACTIVITY LEVEL :			ANNUAL ACTIVITY	OZ PO ACTIV	VOC TPY EM.FAC	VOC PO TPSD
	COUNTIES	VEH 1990	%	TH.GALLS	*.266	7.3LB/T.GL	/78
1	BARNSTABLE	170850	3.9%	2984	794	10.89	0.037
2	BERKSHIRE	0	0.0%	55933	14878	204.16	0.696
3	BRISTOL	392331	8.9%	6851	1822	25.01	0.085
4	DUKES	13098	0.3%	229	61	0.83	0.003
5	ESSEX	510249	11.6%	8911	2370	32.52	0.111
6	FRANKLIN	57334	1.3%	1001	266	3.65	0.012
7	HAMPDEN	347238	7.9%	6064	1613	22.13	0.075
8	HAMPSHIRE	105781	2.4%	1847	491	6.74	0.023
9	MIDDLESEX	1061583	24.1%	18539	4931	67.67	0.231
10	NANTUCKET	7503	0.2%	131	35	0.48	0.002
11	NORFOLK	474503	10.8%	8287	2204	30.25	0.103
12	PLYMOUTH	342898	7.8%	5988	1593	21.86	0.075
13	SUFFOLK	373114	8.5%	6516	1733	23.78	0.081
14	WORCESTER	548046	12.4%	9571	2546	34.93	0.119
	STATE	4404528	100.0%	132852	35339	484.91	1.654

ACTIVITY LEVEL UNITS : TH.GALLS YR
ACTIVITY LEVEL PROCESS : THRUPUT
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : 13 PO THRUPUT : 26.6 %

EMISSION FACTORS : VOC: 7.3 LB
EMISSION FACTOR UNITS : LB/T.GAL AP-42 T.4.4-7

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 83% SAT : 17% SUN : 0%

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.2-5

statst1B

GASOLINE DISTRIBUTION STAGE 1 BALANCED SUBMERGED FILL
VOC EMISSIONS 1990

6 SCC : 25-01-060-053
STAGE 1 BALANCED SUBMERGED FILL

STATEWIDE ACTIVITY 2,297,116.6 THOUSAND GALLONS

	COUNTY ACTIVITY LEVEL : COUNTIEVEH 1990		%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV .266	VOC TPY EM.FAC 7.3LB/TG	CONT.TPY RE .8 CE .9 RP 1.0	UNCON VOC PO TPSD /78	TPSD RE .8 CE .9 RP 1.0
1	BARNSTA	170850	3.9%	89104	23702	325.23	91.06	1.202	0.311
2	BERKSHI	0	0.0%	0	0	0.00	0.00	0.000	0.000
3	BRISTOL	392331	8.9%	204614	54427	746.84	209.12	2.759	0.713
4	DUKES	13098	0.3%	6831	1817	24.93	6.98	0.092	0.024
5	ESSEX	510249	11.6%	266113	70786	971.31	271.97	3.588	0.927
6	FRANKLI	57334	1.3%	29902	7954	109.14	30.56	0.403	0.104
7	HAMPDEN	347238	7.9%	181097	48172	661.00	185.08	2.442	0.631
8	HAMPSHI	105781	2.4%	55169	14675	201.37	56.38	0.744	0.192
9	MIDDLES	1061583	24.1%	553653	147272	2020.83	565.83	7.466	1.930
10	NANTUCK	7503	0.2%	3913	1041	14.28	4.00	0.053	0.014
11	NORFOLK	474503	10.8%	247470	65827	903.27	252.91	3.337	0.863
12	PLYMOUT	342898	7.8%	178833	47570	652.74	182.77	2.412	0.623
13	SUFFOLK	373114	8.5%	194592	51761	710.26	198.87	2.624	0.678
14	WORCEST	548046	12.4%	285825	76030	1043.26	292.11	3.854	0.996
	STATE	4404528	100.0%	2297117	611033	8384.48	2347.65	30.98	8.006

ACTIVITY LEVEL UNITS : TH.GALLS YR
ACTIVITY LEVEL PROCESS : THRUPUT
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : 13 PO THRUPUT : 26.6 %

EMISSION FACTORS : VOC: 7.3 LB
EMISSION FACTOR UNITS : LB/T.GAL AP-42 T.4.4-7

RULE EFFECTIVENESS : 0.8 (Control efficiency = .9)
RULE PENETRATION : 1
SIP RULE : YES

PO INTERVAL : 1 HR
WEEKDAY: 83% SAT : 17% SUN : 0%

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)
REGULATED CATEGORY CE .9, RE .8

TABLE B.2-6

utankbr

GASOLINE DISTRIBUTION UNDERGROUND TANK BREATHING VOC EMISSIONS 1990

7 SCC : 25-01-060-201
UNDERGROUND TANK BREATHING

STATEWIDE ACTIVITY 2,432,912 THOUSAND GALLONS

COUNTY ACTIVITY LEVEL : COUNTIES	 VEH 1990	 %	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV *.266	VOC TPY EM.FAC 1 LB/T.GL	VOC PO TPSD /92
1 BARNSTABLE	170850	3.8%	92088	24495	46.04	0.133
2 BERKSHIRE	109244	2.4%	58882	15663	29.44	0.085
3 BRISTOL	392331	8.7%	211465	56250	105.73	0.306
4 DUKES	13098	0.3%	7060	1878	3.53	0.010
5 ESSEX	510249	11.3%	275023	73156	137.51	0.398
6 FRANKLIN	57334	1.3%	30903	8220	15.45	0.045
7 HAMPDEN	347238	7.7%	187160	49785	93.58	0.271
8 HAMPSHIRE	105781	2.3%	57016	15166	28.51	0.082
9 MIDDLESEX	1061583	23.5%	572191	152203	286.10	0.827
10 NANTUCKET	7503	0.2%	4044	1076	2.02	0.006
11 NORFOLK	474503	10.5%	255756	68031	127.88	0.370
12 PLYMOUTH	342898	7.6%	184821	49162	92.41	0.267
13 SUFFOLK	373114	8.3%	201108	53495	100.55	0.291
14 WORCESTER	548046	12.1%	295395	78575	147.70	0.427
STATE	4513772	100.0%	2432912	647155	1216.46	3.517

ACTIVITY LEVEL UNITS : TH.GALLS YR
ACTIVITY LEVEL PROCESS : THRUPUT
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 13 PO THRUPUT : 26.6 %

EMISSION FACTORS : VOC: 1.0 LB
EMISSION FACTOR UNITS : LB/T.GAL AP-42 T.4.4-7

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 86% SAT : 7% SUN : 7%

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.2-7

ttrans

GASOLINE DISTRIBUTION TANK TRUCK IN TRANSIT
VOC EMISSIONS 1990

8 SCC : 25-05-030-120
TANK TRUCK TRANSIT

STATEWIDE ACTIVITY 2,432,912 * 1.05 = 2,554,557.6 THOUSAND GALLONS

COUNTY ACTIVITY LEVEL :

	COUNTIES	VEH 1990	%	ANNUAL ACTIVITY TH.GALLS	* OZ PO ACTIV .266	VOC TPY EM.FAC .1425LB/T.GL	VOC PO TPSD /78
1	BARNSTABLE	170850	3.8%	96692	25720	6.89	0.023
2	BERKSHIRE	109244	2.4%	61826	16446	4.41	0.015
3	BRISTOL	392331	8.7%	222039	59062	15.82	0.054
4	DUKES	13098	0.3%	7413	1972	0.53	0.002
5	ESSEX	510249	11.3%	288774	76814	20.58	0.070
6	FRANKLIN	57334	1.3%	32448	8631	2.31	0.008
7	HAMPDEN	347238	7.7%	196518	52274	14.00	0.048
8	HAMPSHIRE	105781	2.3%	59866	15924	4.27	0.015
9	MIDDLESEX	1061583	23.5%	600800	159813	42.81	0.146
10	NANTUCKET	7503	0.2%	4246	1130	0.30	0.001
11	NORFOLK	474503	10.5%	268544	71433	19.13	0.065
12	PLYMOUTH	342898	7.6%	194062	51621	13.83	0.047
13	SUFFOLK	373114	8.3%	211163	56169	15.05	0.051
14	WORCESTER	548046	12.1%	310165	82504	22.10	0.075
	STATE	4513772	100.0%	2554558	679512	182.01	0.621

ACTIVITY LEVEL UNITS : TH.GALLS YR
ACTIVITY LEVEL PROCESS : THRUPUT
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : 13 PO THRUPUT : 26.6 %

EMISSION FACTORS : VOC: 0.1425 LB
EMISSION FACTOR UNITS : LB/T.GAL AP-42 T.4.4-5

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 83% SAT : 17 % SUN : 0%

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.2-8

GASOLINE DISTRIBUTION VOC EMISSIONS 1990
APPORTIONMENT TO COUNTIES WITH SEASONAL ADJUSTMENT
TONS PER YEAR AND SUMMER DAY

gastank3

	APPORTIONMENT		STAGE 1	STAGE 1	STAGE 1	STAGE 1		*.266/92	TRANSIT	*.266/78	TOTAL	TOTAL
	1990	COUNTY	SUBMERGE	B.SUBMGE		.266/78	U.TANK B	U.TANK B	LOSS	TR LOSS	GAS DIST	GAS DIST
COUNTIES	VEHICLES	PERCENT	TPY	TPY	EM TPY	EM TPSD	VOC TPY	VOC TPSD	VOC TPY	VOC TPSD	TPY	TPSD
1 BARNSTABLE	170850	3.79%	10.89	91.06	101.95	0.348	46.04	0.133	6.89	0.023	154.88	0.504
2 BERKSHIRE	109244	2.42%	221.09	0.00	221.09	0.754	29.44	0.085	4.41	0.015	254.94	0.854
3 BRISTOL	392331	8.69%	25.01	209.12	234.13	0.798	105.73	0.306	15.82	0.054	355.68	1.158
4 DUKES	13098	0.29%	0.83	6.98	7.81	0.027	3.53	0.010	0.53	0.002	11.87	0.039
5 ESSEX	510249	11.30%	32.52	271.97	304.49	1.038	137.51	0.398	20.57	0.070	462.58	1.506
6 FRANKLIN	57334	1.27%	3.65	30.56	34.21	0.117	15.45	0.045	2.31	0.008	51.97	0.169
7 HAMPDEN	347238	7.69%	22.13	185.08	207.21	0.707	93.58	0.271	14.00	0.048	314.79	1.025
8 HAMPSHIRE	105781	2.34%	6.74	56.38	63.12	0.215	28.51	0.082	4.27	0.015	95.89	0.312
9 MIDDLESEX	1061583	23.52%	67.67	565.83	633.50	2.160	286.10	0.827	42.81	0.146	962.40	3.134
10 NANTUCKET	7503	0.17%	0.48	4.00	4.48	0.015	2.02	0.006	0.30	0.001	6.80	0.022
11 NORFOLK	474503	10.51%	30.25	252.91	283.16	0.966	127.88	0.370	19.13	0.065	430.17	1.401
12 PLYMOUTH	342898	7.60%	21.86	182.77	204.63	0.698	92.41	0.267	13.83	0.047	310.87	1.012
13 SUFFOLK	373114	8.27%	23.78	198.87	222.65	0.759	100.55	0.291	15.05	0.051	338.25	1.101
14 WORCESTER	548046	12.14%	34.93	292.11	327.04	1.115	147.70	0.427	22.10	0.075	496.84	1.618
STATE	4513772	100.00%	501.83	2347.64	2849.47	9.717	1216.46	3.517	182.01	0.621	4247.94	13.855

TABLE B.2-9

AIRCRAFT REFUELING VOC EMISSIONS BY MONTH 1990
TONS PER MONTH AND YEAR AND SUMMER DAY

MTH	MASS AVIA GAS TH.GAL	15.069 VOC TON EF15.07 LB/TH GAL	MASS JET KEROS TH.GAL	VOC TO EF.106 LB/TH. GAL	US JET NAPHTA TH.GAL	US JET NAPHTA @ MONTH	EST MA JET NAPHTA TH.GAL	VOC TON EF 6.65 LB/TH GAL	TOTAL ACRAFT REFUEL VOC TONS
===	=====	======	======	======	=======	=======	======	======	========
JAN	290	2.19	31320	1.66	196841	8.04%	1221	4.06	7.90
FEB	272	2.05	28245	1.50	204878	8.37%	1270	4.22	7.77
MAR	359	2.70	29946	1.59	218423	8.92%	1354	4.50	8.79
APR	360	2.71	28724	1.52	224484	9.17%	1392	4.63	8.86
MAY	484	3.65	30035	1.59	211201	8.63%	1310	4.35	9.59
JUN*	450	3.39	28846	1.53	204605	8.36%	1269	4.22	9.14
JUL*	371	2.80	30675	1.62	155310	6.35%	963	3.20	7.62
AUG*	356	2.68	31352	1.66	210389	8.60%	1305	4.34	8.68
SEP	337	2.54	30212	1.60	234936	9.60%	1457	4.84	8.98
OCT	243	1.83	29813	1.58	204644	8.36%	1269	4.22	7.63
NOV	212	1.60	24309	1.29	201828	8.25%	1251	4.16	7.04
DEC	152	1.15	27915	1.48	180206	7.36%	1117	3.71	6.34
		29.28							
TOT	3886	29.28	351392	18.61	2447745	100.00%	15178	50.45	98.34

US JET NAPHTA APPORTIONMENT TO MASS:

US MILITARY OPER	4399682	
MA MILITARY OPER	27282	0.6201%
US JET NAPHTA FUEL	2447745	
MA JET NAPHTA FUEL *.6201	15178	

* SUMMER ADJUSTMENT:

JUNE	9.14
JULY	7.62
AUGUST	8.68

TOTAL	25.44 / 92 = 0.277 TPSD

fuelair

TABLE B.2-10

aircfuel

AIRCRAFT REFUELING EMISSIONS
VOC EMISSIONS 1990

SCC : 22-75-900-101
AIRCRAFT REFUELING - JET KEROSENE, NAPHTA, AV.GAS

STATEWIDE ACTIVITY 370,456 THOUSAND GALLONS

	COUNTY ACTIVITY LEVEL :			ANNUAL ACTIVITY	OZ PO ACTIV	VOC TPY EM.FAC	VOC PO TPSD
	COUNTIES	AIR EM	%	TH.GALLS	.259	.531 LB/T.GL	/92
1	BARNSTABLE	21.9	1.8%	6747	1747	1.79	0.005
2	BERKSHIRE	11.1	0.9%	3420	886	0.91	0.003
3	BRISTOL	26.3	2.2%	8102	2099	2.15	0.006
4	DUKES	7.6	0.6%	2341	606	0.62	0.002
5	ESSEX	28.2	2.3%	8688	2250	2.31	0.006
6	FRANKLIN	0	0.0%	0	0	0.00	0.000
7	HAMPDEN	16.4	1.4%	5052	1309	1.34	0.004
8	HAMPSHIRE	2.38	0.2%	733	190	0.19	0.001
9	MIDDLESEX	34.6	2.9%	10660	2761	2.83	0.008
10	NANTUCKET	7.4	0.6%	2280	590	0.61	0.002
11	NORFOLK	15.1	1.3%	4652	1205	1.24	0.003
12	PLYMOUTH	15.6	1.3%	4806	1245	1.28	0.004
13	SUFFOLK	971.8	80.8%	602624	156080	160.00	0.450
14	WORCESTER	44.09	3.7%	13583	3518	3.61	0.010
	STATE	1202.47	100.0%	673689	174485	178.86	0.504

ACTIVITY LEVEL UNITS : TH.GALLS YR
ACTIVITY LEVEL PROCESS : THRUPUT
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 26%

EMISSION FACTORS : VOC: 0.531 LB (COMPOSITE)
EMISSION FACTOR UNITS : LB/T.GAL AP-42 T.4.3-2, ASTM

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1.0 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.2-11

PETROLEUM VESSEL UNLOADING VOC EMISSIONS 1989 AND ESTIMATED FOR 1990

portvoc

PORT	CNTY	GASOL TONS	GASOLINE DEN.17857 GAL/LB = GALS 1.8LB/TG VOC TONS	JET FUEL TONS	JET FUEL DEN.14286 GAL/LB = GALS .005LB/TG VOC TONS	KEROSENE TONS	KEROSINE DEN.14286 GAL/LB = GALS .005LB/T VOC TONS	DIS OIL TONS	DIST OIL DEN.14085 GAL/LB = GALS .005LB/T VOC TONS	RES OIL	RES OIL DEN.1266 GAL/LB = GALS .0004LB VOC TONS	NAPHTA TONS	NAPHTA DEN.1563 GAL/LB = GALS 0.5LB/TG VOC TONS	CRUDE TONS	CRUDE OIL DEN.14085 GAL/LB = GALS 0.61LB/T VOC TONS	PETRO/ COAL TONS	PETRO PR DEN.1786 GAL/LB = GALS 2.6LB/TGL VOC TONS	TOTAL VOC EM COUNTY 1989	TOTAL VOC EM COUNTY 1990 G.FACTOR 0.9654
SALEM H	ESSX	0	0.00	0	0.00	0	0.00	81000	0.06	354965	0.00	0	0.00	0	0.00	0	0.00		
GLOUCESTR	ESSX	0	0.00	0	0.00	0	0.00	5946	0.004	0	0.00	0	0.00	0	0.00	0	0.00		
	TOT		0.00		0.00		0.00		0.06		0.00		0.00		0.00		0.00	0.06	0.06
BOS.HARB *	SUFF	5328754	1712.80	937046	0.67	578782	0.41	5010920	3.53	3883382	0.02	18022	1.41	1747	0.15	2096	0.67		
CHELSEA H	SUFF	3253251	1045.68	634179	0.45	146865	0.10	2461002	1.73	751053	0.00	12787	1.00	0	0.00	1869	0.60		
MYSTIC R	SUFF	537597	172.80	210481	0.15	43565	0.03	676484	0.48	617024	0.00	2045	0.16	1039	0.09	20	0.01		
TOWN RIV	SUFF	10482	3.37	0	0.00	0	0.00	53120	0.04	0	0.00	0	0.00	0	0.00	0	0.00		
	TOT		2934.65		1.27		0.55		5.78		0.03		2.57		0.24		1.28	2946.4	2844.41
WEYMOUTH	NORF	659015	211.82	7503	0.01	15590	0.01	576265	0.41	106089	0.00	3155	0.25	0	0.00	0	0.00	212.5	205.14
C.COD CNL	BARN	5154385	1656.75	1305907	0.93	124838	0.09	1215671	0.86	2648341	0.01	6000	0.47	993	0.09	978	0.31		
WOODS HOL	BARN	1645	0.53	2185	0.00	661	0.00	34691	0.02	0	0.00	0	0.00	0	0.00	0	0.00		
	TOT		1657.28		0.93		0.09		0.88		0.01		0.47		0.09		0.31	1660.1	1602.63
N.BEDF/FH	BRIS	1472	0.47	2007	0.00	403	0.00	189618	0.13	91958	0.00	0	0.00	0	0.00	0	0.00		
FALL RIV	BRIS	1297054	416.91	0	0.00	14297	0.01	280157	0.20	265959	0.00	0	0.00	497	0.04	0	0.00		
	TOT		417.38		0.00		0.01		0.33		0.00		0.00		0.04		0.00	417.8	403.31
VINEYARD	DUKE	19749	6.35	1089	0.00	537	0.00	19817	0.01	0	0.00	0	0.00	0	0.00	0	0.00	6.36	6.14
SHOALS H	NANT	7520	2.42	0	0.00	212	0.00	35858	0.03	0	0.00	0	0.00	0	0.00	0	0.00		
REFUGE H	NANT	8207	2.64	0	0.00	0	0.00	38617	0.03	0	0.00	0	0.00	0	0.00	0	0.00		
			5.06		0.00		0.00		0.05		0.00		0.00		0.00		0.00	5.11	4.93
1989	STATE		5232.54		2.21		0.66		7.52		0.04		3.28		0.37		1.60	5248.2	5066.63
1990	STATE*.9654		5051.49		2.14		0.64		7.26		0.04		3.17		0.35		1.54		5066.63
		16279131		3100397		925750		10679166		8718771		42009		4276		4963			39754463
																			0.2549

* Includes Boston Main Waterfront Harbor

TABLE B.2-12

PETROLEUM VESSEL UNLOADING FUEL PRODUCT DENSITIES AND VOC EMISSION FACTORS

	GASOL	JET FUEL	KERO	DIST OIL	RES OIL	NAPHTA	CRUDE OIL	PETR PROD
AP-42 T.4.3-2 LB/GAL PROD DENSITY	5.60	7.00	7.00	7.10	7.90	6.40	7.10	5.60
INVERSE GAL/LB FACTOR	0.1786	0.1429	0.1429	0.1408	0.1266	0.1563	0.1408	0.1786
AP-42 T.4.4-2,6 LB/TH.GAL EMISS FACTOR	1.80	0.05	0.005	0.005	0.0004	0.5	0.61	1.8

fueldens

TABLE B.2-13

SUMMER ADJUSTMENT FOR PETROLEUM VESSEL UNLOADING VOC EMISSIONS 1990

MONTH	DISTILLATE KEROSENE TH.GALS	RESIDUAL TH.GALS	MOTOR GASOLINE TH.GALS	TOTAL TH.GALS		
JUNE	72582	29135	244575	346292		
JULY	74027	57661	249329	381017		
AUGUST	102244	53710	232900	388854		
SUMMER	248853	140506	726804	1116163	/92	= 12132.2
ANNUAL	1669435	777121	2616836	5063392	/365	= 13872.3
			SUMMER ADJUSTMENT			= 0.8746

Source: Petroleum Marketing Annual 1990 Tables 47-49

petrosum

TABLE B.2-14

PETROLEUM VESSEL UNLOADING VOC EMISSIONS 1989 AND ADJUSTED 1990 BY COUNTY AND FUEL TYPE - TONS PER YEAR AND SUMMER DAY

COUNT	GASOL	JET FUEL	KERO	DIST OIL	RES OIL	NAPHT	CRUDE OIL	PETR PROD	TOTAL TONS 1989	TOTAL 1990 0.9654	TOTAL 1990 /365 *.8746 TPSD
BARN	1657.28	0.93	0.09	0.88	0.01	0.47	0.09	0.31	1660.06	1602.62	3.84
BRIST	417.38	0.00	0.01	0.33	0.00	0.00	0.04	0.00	417.76	403.31	0.97
DUKES	6.35	0.00	0.00	0.01	0.00	0.00	0.00	0.00	6.36	6.14	0.01
ESSEX	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.06	0.06	0.00
NORFL	211.82	0.01	0.01	0.41	0.00	0.25	0.00	0.00	212.50	205.15	0.49
SUFF	2934.65	1.27	0.55	5.78	0.03	2.57	0.24	1.29	2946.38	2844.44	6.82
NANT	5.06	0.00	0.00	0.05	0.00	0.00	0.00	0.00	5.11	4.93	0.01
1989									5248.23	5066.64	12.14
STAT	5232.54	2.21	0.66	7.52	0.04	3.29	0.37	1.60	5248.23		
1990											
STAT	5051.49	2.13	0.64	7.26	0.04	3.18	0.36	1.54		5066.64	12.14

```
                         TABLE B.2-15
vessunld3
                  PETROLEUM VESSEL UNLOADING EMISSIONS
                   VOC EMISSIONS 1990

    SCC :          25-05-020-000
                  PETROLEUM VESSEL UNLOADING EMISSIONS

                                  12156914        TH.GALLS (*.1529)/2000
    STATEWIDE ACTIVITY             39,754,463       TONS COMPOSITE

    COUNTY ACTIVITY LEVEL :        ANNUAL     OZ PO          VOC TPY   VOC PO
     ---------------------        ACTIVITY    ACTIV           EM.FAC     TPSD
    COUNTIES   VOC EMISS      %  TH.GALLS  /365*92   .833552LB/TGL      /92
    ========  =========  ====   =======   =======      =========   ======
  1 BARNSTABLE  1602.63  31.6%  3845371    969244        1602.66    4.391
  2 BERKSHIRE             0.0%        0         0           0.00    0.000
  3 BRISTOL      403.31   8.0%   967707    243915         403.32    1.105
  4 DUKES          6.14   0.1%    14732      3713           6.14    0.017
  5 ESSEX          0.06   0.0%      144        36           0.06    0.000
  6 FRANKLIN              0.0%        0         0           0.00    0.000
  7 HAMPDEN               0.0%        0         0           0.00    0.000
  8 HAMPSHIRE             0.0%        0         0           0.00    0.000
  9 MIDDLESEX             0.0%        0         0           0.00    0.000
 10 NANTUCKET      4.93   0.1%    11829      2982           4.93    0.014
 11 NORFOLK      205.14   4.0%   492216    124065         205.14    0.562
 12 PLYMOUTH              0.0%        0         0           0.00    0.000
 13 SUFFOLK     2844.41  56.1%  6824914   1720252        2844.46    7.793
 14 WORCESTER             0.0%        0         0           0.00    0.000

    STATE       5066.62 100.0%12156914   3064208        5066.71   13.881

ACTIVITY LEVEL UNITS :         THOUSAND GALLONS
ACTIVITY LEVEL PROCESS :       TRANSFERRED OR THRUPUT
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK :             7
PEAK OZ WEEKS/YEAR :            52       PO THRUPUT : 25.2%

EMISSION FACTORS :        VOC:  0.833552            (COMPOSITE)
EMISSION FACTOR UNITS :         LB/TH.GAL  AP-42 T.4.3-2, ASTM

RULE EFFECTIVENESS :            N/A
RULE PENETRATION :              N/A
SIP RULE :                      NO

PO INTERVAL :                   1 HR
WEEKDAY:      1.0         SAT : 1        SUN :      1

COMMENTS:      SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)
     1 GALL = 6.54 LB, 1 LB = .1529 GAL  AP-42 T.4.3-2 AV.DENSITY
```

TABLE B.2-16

GASOLINE DISTRIBUTION VOC EMISSIONS 1990 TONS PER YEAR AND SUMMER DAY BY COUNTIES

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gassum3

COUN	STAGE 1 TANK TR TPY	STAGE 1 TANK TR TPSD	UNDER TANK BREATH TPY	UNDER TANK BREATH TPSD	TRANST LOSS TPY	TRANS LOSS TPSD	%	AIRCR REFUEL TPY	AIRCR REFUEL TPSD	PETRO VESSL U TPY	PETRO VESSEL TPSD	TOTAL GASOL DIST TPY	TOTAL GASOL DIST TPSD
BARN	101.95	0.348	46.04	0.133	6.89	0.023	5.	1.79	0.005	1602.62	4.391	1759.29	4.900
BERK	221.08	0.754	29.44	0.085	4.41	0.015	0.	0.91	0.003	0.00	0.000	255.84	0.857
BRIS	234.12	0.798	105.73	0.306	15.82	0.054	1.	2.15	0.006	403.31	1.105	761.13	2.269
DUKE	7.82	0.027	3.53	0.010	0.53	0.002	0.	0.62	0.002	6.14	0.017	18.64	0.058
ESSE	304.49	1.038	137.51	0.397	20.57	0.070	1.	2.31	0.006	0.06	0.000	464.94	1.512
FRAN	34.21	0.117	15.45	0.045	2.31	0.008	0	0.00	0.000	0.00	0.000	51.97	0.170
HAMP	207.21	0.707	93.58	0.270	14.00	0.048	4.	1.34	0.004	0.00	0.000	316.13	1.029
HAMP	63.12	0.215	28.51	0.082	4.27	0.015	0.	0.19	0.001	0.00	0.000	96.09	0.313
MIDD	633.50	2.160	286.10	0.827	42.81	0.146	2.	2.83	0.008	0.00	0.000	965.24	3.141
NANT	4.48	0.015	2.02	0.006	0.30	0.001	1.	0.61	0.002	4.93	0.014	12.34	0.038
NORF	283.16	0.966	127.88	0.370	19.13	0.065	0.	1.24	0.003	205.15	0.562	636.56	1.966
PLYM	204.62	0.698	92.41	0.267	13.83	0.047	0	1.28	0.004	0.00	0.000	312.14	1.016
SUFF	222.66	0.759	100.55	0.291	15.05	0.051	78	160.00	0.438	2844.44	7.793	3342.70	9.332
WORC	327.05	1.115	147.70	0.427	22.10	0.075	2.	3.61	0.010	0.00	0.000	500.46	1.627
STAT	2849.47	9.717	1216.45	3.516	182.02	0.62[illegible]	99	178.88	0.49	5066.65	13.882	9493.47	[illegible]8.227

REFERENCES FOR GASOLINE DISTRIBUTION

1. 1987 Census of Retail Trade, Geographic Area Series, Massachusetts Bureau of Census, U.S. Department of Washington DC. July 1989.

2. Department of Energy, Energy Information Administration, "State Energy Data Report - Consumption Estimates, 1960-1989". Washington DC April 1989.

3. Department of Energy, Energy Information Administration, "Petroleum Marketing Annual and 1990" Energy Information Administration, Office of Oil and Gas, U.S. Department of Energy, Washington DC. Decewmber 1991.

4. U.S. Department of Transportation, Federal Highway Administration, "Highway Statistics 1989 and 1990. FHWA-A-PL-91-003, Washington DC, October 1991.

5. "AP-42 Compilation of Air Pollutant Emission Factors" Volume 1. Stationary Point and Area Sources. 4th Ed. OAQPS RTP. NC. September 1985, Supplement A October 1986, Supplíement B September 1988. Supplement C September 1990, and Supplement D September 1991.

6. "Procedures for Estimating and Applying Rule Effectiveness in Post -1987 Base Year Emission Inventories for Ozone and Carbon Monoxide State Implementation Plans." OAQPS, Policy Development Section. RTP NC. June 1989.

7. "Procedures for the Preparation of Emission Inventories for Precursors of Ozone." Volume 1: General Guidance for Stationary Sources. EPA. 450/4-91-016 OAQPS RTP NC, May 1991.

8. Massachusetts Air Pollution Control Regulations. 310 CMR 7.02-7.18. 1987.

9. Request letter from Kenneth Santlal MA DEP to Jack Frangiamoni MA Department of Revenue for State Gasoline Sales for 1990, September 24, 1991.

10. Massachusetts DEP, Division of Air Quality Control. "Stage II Gasoline Vapor Recovery Program." Background Information and Technical Support Document for Public Hearings on the Proposed Amendments to 310 CMR 7.00 Regulatory Authority MGL c.111 Section 142A-142E, January 1989.

11. "Massachusetts 1982 State Implementation Plan for Ozone and Carbon Monoxide," and Appendix. Massachusetts DEQE Division of Air Quality Control, August 1982.

12. Telephone interviews with DEP Regional office, Springfield, MA and major gasoline distributors in Berkshire County: Robert Vachula - DEP Springfield, Lee Cook - Mobile Oil Corp., Albany, NY, Dennis Kotch - Lipton Gas, Berkshire - Frank Sible, Charles Shogrin - O'Connel Gas.

13. *Passenger Cars and Trucks Registration Counts, MLS-4 by Make and Model for the State of Massachusetts as of July 1, 1990.* Statistical Services Division, R.L. Polk & Co.

14. American Society for Testing and Materials (ASTM), Philadelphia, PA Telephone interview with Dolores Collyer, March 2, 1992.

15. "*FAA Air Traffic Activity FY 1990*", US Department of Transportation, Federal Aviation Administration, Office of Management Systems, Washington, DC, July 1991.

16. "*Waterborne Commerce of the United States, 1989*, Part 1, Waterways and Harbors of the Atlantic Coast. Department of the Army Corps of Engineers, Water Resource Support Center, WRSC-WCUS-89-1, New Orleans, LA, June 1991.

17. EPA Memorandum on Emission Inventory Questions and Answers for AIRS\AMS Training Sessions, Region I July 1992, September 22 1992.

18. EPA Comments on 1990 Draft Emission Inventories, September 1 1992.

Name: GASDIST

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B.3 STATIONARY SOURCE SOLVENT EVAPORATION

Organic solvents contribute to VOC emissions when they evaporate into the atmosphere from industrial, commercial and consumer cleaning and application processes. This section covers the seven solvent uses below, all of which fall under the cleaning and application processes as outlined in Volume 1[1].

B.3-1	Dry Cleaning
B.3-2	Surface Cleaning (Degreasing)
B.3-3	Surface Coating - Non-Industrial, Industrial
B.3-4	Graphic Arts
B.3-5	Cutback Asphalt and Emulsified Asphalt Paving
B.3-6	Commercial and Consumer Solvent Use
B.3-7	Pesticide Application
B.3-8	Miscellaneous Solvents- Bioprocesses, Catastrophic Spills, Asphalt Roofing Kettles and Tankers, Leaking Underground Storage Tanks, and Synthetic Organic Chemical and Storage Tanks.

Most of these solvent use categories span both Point and Area Source inventories. Point sources above 10 tpy were deducted from the Area Source totals in order to avoid double-counting. Emission factors are given in Volume 1, Section 4.3 for the above categories by population and employment. Point emission data was obtained from DEP SSEIS System[2], employment data was obtained from the

Bureau of Census County Business Patterns 1989[3] and population data was obtained from the Bureau of Census[4].

B.3-1 DRY CLEANING

The three basic types of dry cleaning operations are coin-operated, commercial and industrial. Volume 1, Table 4.3-2 provides per capita and employee emission factors for dry cleaning. Employment data for SIC code 7215 and 7216 were obtained from County Business Patterns.[3] The EPA employee emission factor for 2210 lb/year was applied to employment data for SIC 7215 and 7216. Table B.3-1 presents the employee data by Dry Cleaning SIC Codes which are multiplied by the appropriate emission factors. There were no reported emissions above 10 TPY for any single facilty in SIC Code 7216 as shown in Appendix B.3-1[2]. There were no reproted emissions data for SIC 7215.

The following is an example of the dry cleaning emission calculation for Barnstable County:

SIC 7215-6 Employees = 75 + 113 X 2210 lb/yr/2000 lbs
= 207.74 TPY/312 = 0.666 TPSD

Total Dry Cleaning Emissions for the State was estimated at

+ 6,901.83 TPY/52 X 6 = 22.121 TPSD

Although Volume 1 Table 5.8-1 has a national activity of 5 days per week and is seasonally uniform, several calls to dry cleaners in the state revealed that they generally operate 6 days a week, Monday to Saturday.

VOC emissions are calculated for counties in tons per year and summer day and are presented in Table B.3-1 and adjusted for AMS input.

B.3-2 SURFACE CLEANING (DEGREASING)

Surface cleaning or degreasing involves the solvent cleaning or conditioning of metal surfaces and parts, fabricated plastics, electronic and electrical components and other substrates. Degreasing is designed to remove foreign materials such as oil, grease, waxes, and moisture in preparation for treatment such as painting, electroplating, galvanizing and other treatments. The three basic types of degreasing are cold cleaning, vapor cleaning and in-line or conveyorized cleaning.

This methodology used for degreasing is the per employee emission factor of 87 lb for total degreasing per year as given in Table 4.3-4 of Volume 1 and EPA AMS Shortlist.[19] The methodology is similar to that of dry cleaning and the emissions by county are presented annually. The SIC codes include 25, 33-39, 417, 423, 551, 554-556 and 753. Volume 1 Table 5.8-1 gives an activity factor of 6 days per week for degreasing which is seasonally uniform. SSEIS employment data is presented by SIC Code in Appendix Table B.3-2 and sorted by county in Appendix Table B.3-3.

In order to prevent double counting, degreasing employment in SIC Codes from Volume 1 Table 4.3-4 were obtained from SSEIS[2] and subtracted from employment in corresponding SIC Codes reported in County Business Patterns.[3] The following is the methodology for estimating degreasing emissions:

County Business Pattern Employment = 335,359 Employees
SSEIS employment = 63,403 Employees
Area emissions = 335,359-63,403 = 271,956 X 87lb VOC/employee
= 11,830.09 tons VOC
/312 days = 37.917 TPSD

Degreasing emissions are presented by county in tons per year and summer day in Table B.3-2. and adjusted for AMS input in Table B.3-3.

B.3-3 SURFACE COATING - NON-INDUSTRIAL AND INDUSTRIAL

Surface coating include paints, enamels, varnishes, lacquers and other product finishes which are either water or solvent based. Solvents are used both as carriers for the coating and to clean up painting equipment. Surface coating is divided into both non-industrial and industrial applications. Non-industrial applications include Architectural, Automobile Refinishing and Traffic Markings. The industrial surface coating as presented in Volume 1 Table 4.3-6, comprise a myriad of applications including furniture, metal containers, autos, other machinery and miscellaneous equipment.

B.3-3-i NON-INDUSTRIAL SURFACE COATING

The three non-industrial surface coating categories include the following:

- Architectural Coating
- Automobile Refinishing and
- Traffic Paints

B.3-3-i-a ARCHITECTURAL COATING

Architectural surface coatings are used primarily by paint contractors and home owners for coating the interior and exterior of building structures. The most accurate method of inventorying VOC emissions from the application of architectural surface coatings (as recommended in Volume 1) is to obtain sales and distribution data from local wholesale and retail suppliers of solvent-home paints, varnishes and other coatings. The disadvantage of this methodology is that it is very time consuming to contact all the paint distributors and retailers in the state and is beyond the resources of DAQC.

The alternative methodology as recommended in Volume 1 is to use the per capita emissions factor in Table 4.3-6. The national emissions factor of 4.6 lbs/capita/year is recommended (AP-42 T.4.2.1-1).[5] The seasonal adjustment factor is 1.3 (Vol.1 T.5.8-1) and activity is 7 days per week. However, telephone surveys to paint distributors in the State revealed that the summer months of June, July and August had higher paint sales than the rest of the year. According to Mr. David Lohr[6] Regional Sales Director for California paints in the Northeast, the period from April to

October accounts for about 70% of annual sales and the summer months of June to August account for about 35% of annual sales. Other paint distributors on an average had comparable seasonal estimates. The seasonal adjustment factor is estimated at 1.4 (35/25) and is higher than the national estimate of 1.3 in Volume 1 T.5.8-1. The following is the VOC emission calculation for architectural surface coating:

6,016,425 (pop) X 4.6 lb/cap/yr/2,000 lb = 13,837.78 TPY

Typical Summer day emissions = 13,837.78/365 X 1.4 = 53.076 TPSD

Architectural Surface Coating emissions are apportioned to counties based on population and are presented in Table B.3-4.

B.3-3-i-b AUTOMOBILE REFINISHING

Automobile Refinishing VOC emissions were estimated using the per capita emissions factor of 2.3 lb/year as given in Volume 1 Table 4.3-6. Activity is uniform throughout the year at 5 days per week according to Volume 1 Table 5.8-1. There are no point sources above 10 TPY reported in SIC 7532 so that the scale-up methodology could not be utilized.

6,016,425 X 2.3 lb/cap = 6,918.89 TPY /260 = 26.61 TPSD

Emissions are presented in Table B.3-5 for AMS input.

B.3-3-i-c TRAFFIC PAINTS

Traffic paints are used to mark pavement including dividing lines for traffic lanes, parking space markings, crosswalks, and arrows. Markings are usually applied by state or local maintenance crews or contractors. VOC results from the evaporation of organic solvents from roadways where markings are applied. The per capita factor of 0.5 lb per year given in Volume 1 Table 4.3-6 is used. The VOC emission calculation is as follows:

6,016,425 X 0.5 lb/cap/yr /2,000 lbs = 1,504.11 TPY/260
= 5.785 TPSD

Emissions are apportioned to counties by population distribution and are presented in Table B.3-6. According to Steve Quinlan of the Massachusetts DPW[7], the traffic painting activity is five days per week Monday to Friday i.e., 260 days per year any painting on weekends for special projects is rare.

The total VOC emissions for Non-Industrial Surface Coating amounted to 22,260.77 TPY and 85.473 TPSD and are presented in Table B.3-7.

B.3-3-ii INDUSTRIAL SURFACE COATING

Industrial Surface Coating comprises several applications as outlined in Volume 1 Table 4.3-6. VOC emissions from these applications were estimated using the given emission factors per employee and per capita. For each category, the employment levels for the appropriate SIC Codes were taken from the County Business Patterns[3] by counties. Population data was obtained from the 1990 Census.[4] For the following subcategories, employment/population data were applied to the appropriate emission factors to estimate gross area source emissions. SSEIS Point Sources[2] above 10 tpy in the appropriate SIC codes were subtracted from each category for each county to obtain net area emissions as presented in Table B.3-8.

The following are the thirteen Industrial Surface Coating Subcategories and their emission factor method:

1. Furniture and Fixtures - Employment
2. Metal Containers - Employment
3. Motor Vehicles -new - Employment
4. Machinery and Equipment - Employment
5. Appliances - Employment
6. Other Transportation Equipment - Employment
7. Sheet, Strip, Metal Coil - Employment
8. Factory Finished Wood - Employment
9. Electrical Insulation - Employment
10. Other Products Coating - Population

11. High Performance Maintenance Equipment- Population

12. Marine Coatings - Employment

13. Other Special Purpose Coating - Population.

VOC emissions for these applications are calculated in Table B.3-8. An example emission calculation for Furniture and Fixture is as follows:

Employment SIC 25 = 6,615 employees X 1,311 lb/Employee/2,000 lbs = 4,336.13 TPY

The total emission in SSEIS is 422 tons. Because of insufficient employment data in SSEIS for SIC 25, the equivalent employment using the EPA given employee factors are subtracted. The emission factor of 1,311 lb per employee at 422 tons VOC or 844,000 lbs is equivalent to 644 employees. The net figure is (6,615-644) 5,971 employees. Net Area Source emissions for Furniture & Fixtures amount to 3,750.07 (Rounding Error) TPY or 14.423 TPSD as presented in Tables B.3-8 and B.3-9.

The same procedure of subtracting the estimated employment was followed for the other Industrial Surface Coating sub categories and are presented in Tables B.3-10 to B.3-21. Total VOC emissions for Industrial Surface Coating are summarized in Table B.3-8 at 28,791.57 TPY and 110.737 TPSD.

B.3-4 GRAPHIC ARTS

Graphic Arts includes operations involved in printing of newspapers, magazines, books and other printing materials. The majority of graphic arts solvent were operations is confirmed in printing ink formulations with a lesser amount in equipment cleaning and fountain solutions. The six basic operations used in graphic arts are lithography, gravure, letterpress, flexography, screen printing and metal decorating.

Volume 1 Section 4.3.4 does not recommend the per employee emission factor because of the number of captive graphic arts operations that are used in industries other than printing and publishing (SIC 27). The recommended emission factor is the per capita factor given in Volume 1 Table 4.3-9 as 1.3 lb per year. The emission calculation for graphic arts is as follows:

6,016,425 (pop) X 1.3 lb/2,000 lb = 3,910.68 TPY

3,910.68 - 821 (SSEIS > 10 TPY) = 3,089.68 TPY

3,089.68 TPY/52 X 5 = 11.883 TPSD

Point sources higher than 10 TPY and less than 100 TPY for SIC 27 were obtained from SSEIS[2] and were subtracted from each county as shown in Table B.3-22. Volume 1 Table 5.8-1[1] gives a seasonally uniform factor with activity at 5 days per week.

B.3-5 CUTBACK ASPHALT AND EMULSIFIED ASPHALT PAVING

The two types of asphalt paving used for road paving and repair are cutback asphalt and emulsified asphalt. Cutback asphalt is used as a diluent, sealant and bonding agent for paving materials. It is composed mainly of petroleum-distillate: gasoline or naphtha (rapid cure), kerosene (medium cure), and other oil type solvents (slow cure). Evaporation from slow and medium cure, according to AP-42 section 4.5[5], are known to continue for several months after paving. Although Cutback asphalt usage is restricted by Massachusetts regulation CMR 7.18[8] during the ozone season April to October with the exception of Dukes and Nantucket counties, road repair is done throughout the year.

Emulsified asphalt is a type of liquified road surfacing material that is used in the same applications as cutback asphalt. Emulsified asphalt uses a blend of water with an emulsifier namely soap. Similar to cutback asphalt, emulsified asphalt consists of rapid, medium and slow cure.

Data for cutback and emulsified asphalt was obtained from Ross Bentren of the Asphalt Institute.[9] For 1990, the amount of cutback asphalt and emulsified asphalt used in Massachusetts was 707 short tons and 5,133 short tons respectively.

The following is the methodology utilizing EPA's Volume 1 and Comment #42 of the Draft Inventory[20]:

707 tons cutback X .35 solvent fraction = 247.45 tons solvent

247.45 /3 =82.5 X.95 (Rapid Cure) = 78.38 Tons VOC

X .70 (Medium Cure) = 57.75 Tons VOC

X .25 (Slow Cure) = 20.63 Tons VOC

TOTAL = 156.76 Tons VOC

Emulsified Asphalt emissions is estimated using the per capita

emission factor of 0.004 lb per person given in EPA/AIRS/OMS Shortlist.

6,016,425 X 0.0004 lb = 12.03 TPY/365 days = 0.033 TPSD

Total Asphalt emissions amount to (156.76 + 12.03) = 168.79 TPY

Asphalt emissions were apportioned to counties based on population distribution and are presented in Tables B.3-23 and B.3-24. Asphalt emissions particularly medium and slow cure generally occur several months after application even though the usage is restricted in the ozone season. Therefore the emissions are expected to be uniform throughout the year.

B.3-6 COMMERCIAL/CONSUMER SOLVENT USE

This category covers a very wide spectrum of applications which include household products, toiletries, aerosol products (including household pesticides) rubbing compounds, windshield washing fluids, polishes and waxes, non-industrial adhesives, space deodorants, moth control, and laundry detergents and treatment. These applications together were estimated in Volume 1 Section 4.3.7 at 6.3 lb VOC capita/year. This category does not represent small cold cleaning degreasing, drycleaning, auto refinishing, architectural surface coating, graphic arts, cutback asphalt, and pesticides applications. Solvents are generally used every day and there is no seasonal variation (Volume 1 Table 5.8-1).

The following is the calculation for this category:

6,016,425 (population) X 6.3 lb VOC/cap/yr = 18,951.74 tons

Summer day emissions = 18,951.74 /365 = 51.923 TPSD

Emissions are apportioned to counties based on population and are presented in Table B.3-25.

B.3-7 PESTICIDE APPLICATION

Pesticides include a wide variety of chemicals used to kill or retard the growth of insects, rodents, fungi, weeds and other micro-organisms. While pesticide use is typically associated with agricultural applications, a significant quantity is used in non-agricultural applications in urban and suburban areas.

The most accurate methodology for calculating VOC emissions from pesticides is to obtain total quantity by type of pesticide used in the state. Several state and federal agencies were contacted including the State Department of Food and Agriculture[10] and none of them had any data on quantity used. The Department of Food and Agriculture maintains a list of banned chemicals, and the only way of knowing actual quantity used is to contact the manufacturers of hundreds of different chemicals and who may not want to divulge confidential information. This would be beyond the resources of DEP-DAQC. The most feasible methodology is to obtain total acreage under agricultural and non-agricultural land uses and use the national estimated quantity of pesticides used per harvested acres as recommended in Volume 1.[1]

B.3-7-i AGRICULTURAL PESTICIDES

Agricultural pesticide use in Massachusetts was obtained from an agricultural report conducted by the Environmental Institute at the University of Massachusetts at Amherst in cooperation with the Office of Research and Standards at DEP.[11] Agricultural acreage usage was estimated from land use maps and aerial photographic surveys which were conducted in 1951, 1971 and 1980 to 1985 with each survey being the refinement of previous surveys. Ground surveys were made through field inspections from May 1984 to October 1985. An estimated 95% of agricultural land was inspected for towns with farms above 100 acres of any crop.

Pesticide usage per acre in the report was derived from several agricultural surveys conducted in the Northeast States. The data from these surveys included an alphabetical listing of pesticides used for each crop, e.g. vegetables, corn, applies, etc. The pesticide data presented in the U. Mass/DEP report,[11] therefore, is not an actual inventory of pesticide usage for each town in the state, but an estimate of the application rates of pesticide/herbicide per acre of each crop. Some of the application rates were presented in ranges of pounds per acre per crop. As there were no actual application rates given per acre, and that some chemicals may or may not be used, the list of possible application rates per acre were tallied by pesticide class and weighted by chemical use in order to get an average application rate per acre. This weighted average application rate is presented in the 2nd column in lb/acre in Table B.3-26. The report did not present any application rates for tilled land, most of which is eventually planted (surveys were taken in May before planting) and, therefore, had to be estimated based on the average application rates of the crops in column 2 of Table B.3-26 from corn to strawberry.

The estimated acreage for each crop was derived from the U Mass/DEP Report[11] for all towns in each county. The crop acreage was tallied to get a county total and was then multiplied by the average crop application rates per acre to get a county pesticide estimate. The pesticide application rates for all the crops were than tallied to get a county total. Appendix B.3-4 is an excerpt from the "U. Mass/DEP Study" which covers the application rates per acre of herbicides, insecticides and fungicides for the cucumber and watermelon crop. The weighted average pesticide application rate per acre was estimated at 1.9487 lbs as shown in Appendix B.3-4 and Table B.3-26. The same procedure was done for the other crops as presented in Table B.3-26.

This pesticide total (which is really the active ingredient) is multiplied by a factor of 2.45 as recommended in Volume 1 in order to estimate the solvent use.

Because the pesticide emissions were calculated for 1984/1985, a growth factor had to be calculated for 1987. This factor of 1.0125% was estimated for general crops using interpolation of the total cropland acreage for 1982 and 1987 which was obtained from the U.S. Census of Agriculture 1987.[12] Since the 1987 Census is the latest year of data and is updated every 5 years, the next report would be published for 1992. Specific growth rates were estimated for several crops which were identified in the Census such as corn and apples. These growth factors are used for 1990 and would be updated whenever the 1992 Census of

Agriculture is available.

The author of the U Mass/DEP Report, Dr. Allen Barker,[11] was contacted to ascertain whether any revision or follow-up studies were done since June 1986. He said that there may be very little change in agricultural activity and pesticide usage between 1986 to 1990, except for dairy farming which has been declining. He does not foresee another study like this for another 3-5 years. The estimated pesticide usage for the 1987 Inventory will therefore be used for this 1990 Base Year Inventory.

According to Mr. Jay Slattery of the Massachusetts Farm Bureau,[11] pesticide applications occur mostly during the planting and growing season covering the period between April to October. This period covers a total of 214 days and even though spraying takes place 6 days per week, evaporation occurs every day during the week.

The following VOC estimation for Massachusetts as presented in Tables B.3-26 and is combined with Non Agricultural Pesticide emissions in Table B3-27 :

Pesticide use X solvent content

399.54 X 2.45 = 978.88 Tons VOC

The total statewide pesticide application from agricultural use at 399.54 tons which were applied to a total 346,800 acres and yielded a pesticide application of 2.304 lbs. per acre and falls within the 2-5 lb/acre range as provided as a check in Volume 1.

B.3-7ii NON-AGRICULTURAL PESTICIDES

Total acreage and pesticide applications for non-agricultural l[illegible] use was obtained from a report by Harrison Biotech, Inc. to the Massachusetts Department of Food and Agriculture in 1985.[13]

This report estimated herbicide use and total acreage for agricultural crops, residential lawns; municipal and institutional land holdings such as parks and recreation, golf courses, commercial land use, and rail/highway right-of-way use. The golf course data was obtained from the U Mass/DEP Report[11] which had more specific data by county and pesticide application rates. Alternative application rates of pesticide per acre was obtained from National Lawn Care Association in New York (Dr. Wilkinson)[14] who used data from the National Agricultural Chemical Association, Golf Course Association of America, and the National Pest Control Association. The Biotech report application rate is used since it is State specific and applied to the U. Mass/DEP acreage. The go[illegible] course pesticide usage by county is presented in Table B.3-26.

The following is the non-agricultural pesticide usage application using the Biotech Study:

Residential Lawn: 210,000 Acres X 0.524 lb/Acre = 55.02 Tons Pesticide
Parks & Recreation: 42,000 Acres X 0.238 lb/Acre = 5.00 Tons Pesticide
Commercial: 50,000 Acres X 0.600 lb/Acre = 15.00 Tons Pesticide
Right of Way: 14,700 Acres X 6.830 lb/Acre = 50.20 Tons Pesticide
TOTAL = 125.22 Tons Pesticide

Volume 1 recommends that the active ingredient for non-agricultural pesticides must be multiplied by a factor of 2.45 to determine the solvent content.

Pesticides are generally applied six days per week and mostly in the growing season - April to October (214 days). Volume 1 Table 5.8.-1 suggests a seasonal adjustment factor of 1.3 but this is not used since the growing season varies regionally. However, emissions through evaporation may occur every day of the week.

Non-agricultural pesticides amount to 125.22 tons of active ingredient. Non-agricultural pesticide application is apportioned to counties based on the distribution of single family housing units taken from the University of Massachusetts MISER study.[16] and presented in Table B.3-27.

SUMMARY - PESTICIDES

Agricultural and non-agricultural pesticides amount to a total of (125.2 + 399.55) 524.75 Tons active ingredient. This multiplied by 2.45 gives a VOC total of 1,285.7 Tons as presented in Table B.3-27. Pesticide application generally occurs during the growing season April to October (214 days) for a total of 6.008 Tons VOC per Summer day.

B.3-8 MISCELLANEOUS SOLVENTS

This Section comprises the following subcategories:

i. Bioprocess Emissions
ii. Catastrophic/Accidental Releases
iii. Asphalt Roofing Kettles and Tankers
iv. Leaking Underground Storage Tanks (LUST)
v. Synthetic Organic Chemical Storage Tanks

The other category as described in Volume 1 Sections 4.3-9 covering "Barge, Tank Truck, Rail car and Drum Cleaning" is not inventoried because of a lack of the necessary data such as SIC codes and individual plant information to determine the activity and emissi factors.

B.3-8-i BIOPROCESS EMISSIONS

This category includes emissions from biological processes which include bakeries, breweries, distilleries and wineries. The methodology for estimating VOC emissions is the scale-up methodology as described in Section 5.6 of Volume 1. Point Source emissions were obtained from SSEIS by appropriate SIC Codes. Employment data was obtained from the County Business Patterns for the appropriate SIC Codes. Because the number of employees reported in County Business Patters for SIC 2082 and 2084 for breweries, distilleries and wineries accounted for only 366 employees, and SSEIS had no reported emissions, area source emissio would not be calculated for these categories. Furthermore, the scale-up methodology could not be used for these categories because SSEIS did not report any VOC emissions for these facilities.

BAKERIES

Bakeries emit VOC, primarily ethanol formed by yeast fermentation of bread or dough during the baking process. The SIC Codes given in the SIC manual for bakeries are 546 and 205. SSEIS reported 1,652 employees emitting 251 tons VOC for these SIC Codes. The County Business Patterns reported 16,067 employees for these SIC Codes. The following is the scale-up methodology for estimating Area Source VOC emissions from bakeries:

Non-Reported Emissions = (Reported Emissions/Reported Employment)X
(Total Employment - Reported Employment)

= (251/1,652)X(16,067-1,652)

= 0.15194 X 14,415 = 2,190.22 Tons VOC

= 2,190.22/365 days = 6.001 TPSD

Bakery VOC emissions are apportioned to counties based on population because some SIC employment in County Business Patterns were suppressed for some counties. SSEIS Point Sources above 10 TPY were deducted from their respective counties to get net Area Source emissions. Even though large bakeries operate 5 to 6 days per week, the smaller bakeries generally operate 7 days and is uniform throughout the year. Bakery VOC emissions are presented in Table B.3-28 and are adjusted for AMS input by estimating the tonnage of bakery products and an adjusted emission factor.

B.3-8-ii CATASTROPHIC/ACCIDENTAL RELEASES

Sources in this category represent unplanned, unintentional emissions associated with evaporation or combustion of petroleum and solvent spills. Source categories include rail car, tank truck oil spills and industrial accidents. Because a wide range of fuel and solvent types are spilled, the nature and quantity of VOC among other air toxics emissions may vary.

Data for catastrophic/accidental releases was obtained from the DEP Division of Solid and Hazardous Waste[17] and the U.S. Department of Transportation, U.S. Coast Guard for 1990.[18] The DEP spills data was supplemented by Coast Guard data. The DEP data was provided by County for different types of VOC and petroleum spills in gallons. The Coa Guard data had a lot of spills data with unknown quantity of VOC's and Non-VOC's. The VOC's with quantity spilled were selected and were merged with the DEP data.

The data for VOC spills was provided in gallons and had to be converted to pounds and tons using the product density provided in AP-42 Table 4.3-2. This table did not cover some of the VOC chemicals spilled and therefore the densities of the closest chemicals were used. The densities ranged from 6.6 to 12.3 lb/gal. Because there was no data on the amount of chemical VOC that were recovered through site clean-up or amount burned, the assumption is that 100% is released to the atmosphere. This estimate should compensate for the large mount of spills that are of unknown quantity as reported in the Coast Guard data.

The VOC estimation for solvent spills is presented in Table B.3-2 Total VOC was estimated at 30.98 TPY and as vaporization from spills generally continue to occur after spillage, it is divided by 365 days for a total of 0.085 TPSD.

Petroleum spills VOC estimation is similar to solvent spills. DEP data was provided in gallons. EPA's Comment #52 on the Draft Inventory was followed in which the fuel density was used and 100% evaporation was assumed. This factor was used even though volatility and density may differ among fuels. The total estimated VOC is 898.31 TPY and 2.461 TPSD statewide for petroleum spills as presented in Table B.3-30.

The total VOC emissions for catastrophic solvent and petroleum spills amounted to 929.28 TPY and 2.546 TPSD and are presented in

Table B.3-30. Spills VOC emissions are adjusted for AMS input and presented in Table B.3-31 for Solvent and Petroleum Spills combined.

B.3-8-iii ASPHALT ROOFING KETTLES AND TANKERS

This category is covered under SIC 2951 (paving mixtures & blocks) and 2952 (asphalt felts and coating) according to 1986/87 Directory of Massachusetts Manufacturers[21] and County Business Patterns.[3] For SIC codes 2951 and 2952, SSEIS recorded total employment at 284 employees. Total VOC emissions for SIC 2951 and 2952 (roofing) were 11 tons and no facility was emitted more than 10 tons. Therefore, no SSEIS employment data is subtracted in the scale-up equation.

A spot check of two asphalt roofing plants was made on the SSEIS system at the segment process level. The VOC emissions from these plants were estimated from the amount and type of fuel burned, and the amount and type of asphalt used in the heating process in which solvents are evaporated. The emissions/employee factor for roofing operations is calculated at (11/284) 0.0387 tons VOC/employee. Total employment in County Business Patterns for SIC codes 2951 and 2952 is 863. The following is the calculation using the scaling-up formula:

(11/284) X (863) = 33.40 Tons VOC

(No point source subtraction since no facility emitted more than
10 tons)

The summer seasonal adjustment is assumed to be the same (1.4) as Architectural coating and presented in Table B.3-32.

Summer Weekday Emissions = 33.40/312 x 1.4 = 0.150 TPSD

B.3-8-iv LEAKING UNDERGROUND STORAGE TANKS (USTS)

According to Volume 1 Section 4.8-6,[1] many tanks are are over years old and are constructed of steel which may rust over time. LUSTS may result in contamination of drinking water, subsurface soils, ground and surface water, and may emit toxic/explosive vapors. The contaminated soil and water may also emit VOC. VOC emissions occur through remediation which includes soil venting, air stripping of VOC in water, soil aeration, product recovery and carbon adsorption.

Although research on emissions from LUSTS is underway, the methodology used here is take from a study performed by Radian Corp.[22] In a memo to SIP inventory preparers, Radian provided a VOC emission factor of 28 lb per day per site that undergoing or initiating remediation.

The DEP Bureau of Waste Site Clean-up Division of Release Assessment and Remediation provided LUST data by county for the ozone season May to September 1990. A total of 414 LUST sites were identified and are presented in Appendix Table B.3-6. The following is the VOC emission calculation from LUSTS and presented in Tables B.3-33 and 34 :

414 X 28 lb = 11592 lb /2000 = 5.8 tons /153 = 0.038 TPSD VOC.

B.3-8-v SYNTHETIC ORGANIC CHEMICAL AND STORAGE TANKS

The synthetic organic chemical industries manufacture organic chemicals in the industrial/commercial sector. Chemicals in storage tanks may be a source of VOC emissions due to breathing and working losses. Facilities above 10 tpy are reported under the Stationary Point source section. The Scale-up methodology as described in Volume 1

Section 5.6 is used for estimating VOC emissions unde 10 tpy and should cover losses chemical storage tanks. The SIC code is 28 and employment data is obtained from the County Business Patterns.[3] The following is the Scale-up methodology:

Non-reported emissions = [(reported emiss / reported employment) x (total employment)] - reported emissions

Non-reported emissions = [(1,111/4,241) x 12,681] - 916.44

= [(0.26197 x 12,681] - 916.44

= 3,322.04 - 916.44

= 2,405.6 tons /365 = 6.59 tpsd

Area source chemical and storage tanks are apportionned to counties based on employment in SIC 28 and are presented in Table B.3-35.

SUMMARY - SOLVENT EVAPORATION

Total emissions for all the categories were summed in Table B.3-37 for a total of 98,844.47 TPY or 341.853 TPSD.

TABLE B.3-1

drycln3

DRY CLEANING VOC EMISSIONS 1990

SCC : 24-20-000-000
DRY CLEANING SIC 7215, 7216

STATEWIDE ACTIVITY 6,246 EMPLOYEES

	COUNTY ACTIVITY LEVEL :			TOTAL EMPLOY	OZ PO ACTIV /312*78	VOC TPY EM.FAC 2210 LB	VOC PO TPSD /78
	COUNTIES	7215	7216				
1	BARNSTABLE	75	113	188	47	207.74	0.666
2	BERKSHIRE	0	126	126	32	139.23	0.446
3	BRISTOL	183	260	443	111	489.52	1.569
4	DUKES	0	20	20	5	22.10	0.071
5	ESSEX	183	422	605	151	668.53	2.143
6	FRANKLIN	0	120	120	30	132.60	0.425
7	HAMPDEN	163	260	423	106	467.42	1.498
8	HAMPSHIRE	0	250	250	63	276.25	0.885
9	MIDDLESEX	392	1209	1601	400	1769.11	5.670
10	NANTUCKET	0	10	10	3	11.05	0.035
11	NORFOLK	164	821	985	246	1088.43	3.489
12	PLYMOUTH	145	201	346	87	382.33	1.225
13	SUFFOLK	144	474	618	155	682.89	2.189
14	WORCESTER	134	377	511	128	564.66	1.810
	STATE	1583	4663	6246	1562	6901.83	22.121

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD : CODE 371

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 2210 LB CODE 560
EMISSION FACTOR UNITS : LB/EMPLOY VOL.1 T.4.3-2

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-2

DEGREASING VOC EMISSIONS USING SCALING-UP METHOD 1990

degcbp

COUNTIES	CBP SIC 25	CBP SIC 33	CBP SIC 34	CBP SIC 35	CBP SIC 36	CBP SIC 37	CBP SIC 38	CBP SIC 39	CBP SIC 753	TOTAL CBP EMPLOY	TOTAL SSEIS EMPLOY	TOTAL SSEIS VOC EM	CBP-SSEIS EMPLOY	VOC EM EF 87LB TPY	VOC EM TPSD /312
BARNSTABL	0	99	86	110	305	135	601	239	398	1973	0	0	1973	85.83	0.275
BERKSHIRE	0	249	416	1412	1035	0	4999	84	259	8454	684	98	7770	338.00	1.083
BRISTOL	304	7869	4328	2542	10235	613	2398	7199	1160	36648	12816	982	23832	1036.69	3.323
DUKES	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.000
ESSEX	488	323	3467	7855	99	8229	11611	1315	1490	34877	16367	777	18510	805.19	2.581
FRANKLIN	210	249	668	651	209	0	499	241	110	2837	495	12	2342	101.88	0.327
HAMPDEN	310	1087	6424	6648	2227	692	580	4089	1299	23356	7552	524	15804	687.47	2.203
HAMPSHIRE	117	620	641	439	0	0	2499	448	216	4980	55	34	4925	214.24	0.687
MIDDLESEX	844	2155	7778	38997	27381	10299	28052	2753	3778	122037	15052	1352	106985	4653.85	14.916
NANTUCKET	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.000
NORFOLK	580	1062	3664	5265	9745	154	10732	821	1516	33539	4296	269	29243	1272.07	4.077
PLYMOUTH	220	428	1553	2020	1931	1070	2336	657	876	11091	559	102	10532	458.14	1.468
SUFFOLK	708	229	2801	2203	2335	527	2305	697	1445	13250	364	103	12886	560.54	1.797
WORCESTER	2834	2632	10006	12648	5797	254	4502	1848	1796	42317	5163	565	37154	1616.20	5.180
STATE	6615	17002	41832	80790	61299	21973	71114	20391	14343	335359	63403	4818	271956	11830.09	37.917
										335359					

TABLE B.3-3

degrams

TOTAL DEGREASING VOC EMISSIONS 1990

12 SCC : 24-15-000-000

STATEWIDE ACTIVITY 271,956 EMPLOYEES (CODE 371)

COUNTY ACTIVITY LEVEL :

	COUNTIES	NET TOTAL EMPLOY	OZ PO ACTIV /312*78	VOC TPY EM.FAC 87 LB/EMP	VOC PO TPSD /78
1	BARNSTABLE	1973	493	85.83	0.275
2	BERKSHIRE	7770	1943	338.00	1.083
3	BRISTOL	23832	5958	1036.69	3.323
4	DUKES	0	0	0.00	0.000
5	ESSEX	18510	4628	805.19	2.581
6	FRANKLIN	2342	586	101.88	0.327
7	HAMPDEN	15804	3951	687.47	2.203
8	HAMPSHIRE	4925	1231	214.24	0.687
9	MIDDLESEX	106985	26746	4653.85	14.916
10	NANTUCKET	0	0	0.00	0.000
11	NORFOLK	29243	7311	1272.07	4.077
12	PLYMOUTH	10532	2633	458.14	1.468
13	SUFFOLK	12886	3222	560.54	1.797
14	WORCESTER	37154	9289	1616.20	5.180
	STATE	271956	67989	11830.09	37.917

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD : CODE 371

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 87 LB
EMISSION FACTOR UNITS : LB/EMPLOY VOL.1 T.4.3-4

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-4

archcoat

SURFACE COATING - ARCHITECTURAL PAINT VOC EMISSIONS 1990

13 SCC : 24-01-001-000

STATE ACTIVITY LEVEL : 6,016,425 POPULATION

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY	OZ PO ACTIV *1.4*92	VOC TPY EM.FAC 4.6 LB/CAP	VOC PO TPSD /92
1	BARNSTABLE	186605	3.1%		65849	429.19	1.646
2	BERKSHIRE	139352	2.3%		49174	320.51	1.229
3	BRISTOL	506325	8.4%		178670	1164.55	4.467
4	DUKES	11639	0.2%		4107	26.77	0.103
5	ESSEX	670080	11.1%		236456	1541.18	5.911
6	FRANKLIN	70092	1.2%		24734	161.21	0.618
7	HAMPDEN	456310	7.6%		161021	1049.51	4.026
8	HAMPSHIRE	146568	2.4%		51720	337.11	1.293
9	MIDDLESEX	1398468	23.2%		493487	3216.48	12.337
10	NANTUCKET	6012	0.1%		2121	13.83	0.053
11	NORFOLK	616087	10.2%		217403	1417.00	5.435
12	PLYMOUTH	435276	7.2%		153599	1001.13	3.840
13	SUFFOLK	663906	11.0%		234277	1526.98	5.857
14	WORCESTER	709705	11.8%		250438	1632.32	6.261
	STATE	6016425	100.0%		2123056	13837.78	53.076

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
WEEKS/YEAR : 52 PO THRUPUT : 35.3 %

EMISSION FACTORS : VOC: 4.6 LB
EMISSION FACTOR UNITS : PERSON VOL.1 T.4.3.6

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-5

autoref

SURFACE COATING - AUTOMOBILE REFINISHING
VOC EMISSIONS

14 SCC : 24-01-005-000

STATE ACTIVITY LEVEL : 6,016,425 POPULATION

	COUNTY ACTIVITY LEVEL :			ANNUAL ACTIVITY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 2.3LB/CAP	VOC PO TPSD /65
	COUNTIES	POP 1990	%				
1	BARNSTABLE	186605	3.1%	same	46651	214.60	0.825
2	BERKSHIRE	139352	2.3%		34838	160.25	0.616
3	BRISTOL	506325	8.4%		126581	582.27	2.240
4	DUKES	11639	0.2%		2910	13.38	0.051
5	ESSEX	670080	11.1%		167520	770.59	2.964
6	FRANKLIN	70092	1.2%		17523	80.61	0.310
7	HAMPDEN	456310	7.6%		114078	524.76	2.018
8	HAMPSHIRE	146568	2.4%		36642	168.55	0.648
9	MIDDLESEX	1398468	23.2%		349617	1608.24	6.186
10	NANTUCKET	6012	0.1%		1503	6.91	0.027
11	NORFOLK	616087	10.2%		154022	708.50	2.725
12	PLYMOUTH	435276	7.2%		108819	500.57	1.925
13	SUFFOLK	663906	11.0%		165977	763.49	2.937
14	WORCESTER	709705	11.8%		177426	816.16	3.139
	STATE	6016425	100.0%		1504106	6918.89	26.611

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 13 PO THRUPUT : 25%

EMISSION FACTORS : VOC: 2.3 LB
EMISSION FACTOR UNITS : PERSON VOL.1 SEC.4.3.7

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 83% SAT : 17% SUN : 0%

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-6

trafficm3

TRAFFIC PAINTS VOC EMISSION 1990

15 SCC : 24-01-008-000

STATE ACTIVITY LEVEL : 6,016,425 POPULATION

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 0.5 LB/CAP	VOC PO TPSD /65
1	BARNSTABLE	186605	3.1%		46651	46.65	0.179
2	BERKSHIRE	139352	2.3%		34838	34.84	0.134
3	BRISTOL	506325	8.4%		126581	126.58	0.487
4	DUKES	11639	0.2%		2910	2.91	0.011
5	ESSEX	670080	11.1%		167520	167.52	0.644
6	FRANKLIN	70092	1.2%		17523	17.52	0.067
7	HAMPDEN	456310	7.6%		114078	114.08	0.439
8	HAMPSHIRE	146568	2.4%		36642	36.64	0.141
9	MIDDLESEX	1398468	23.2%		349617	349.62	1.345
10	NANTUCKET	6012	0.1%		1503	1.50	0.006
11	NORFOLK	616087	10.2%		154022	154.02	0.592
12	PLYMOUTH	435276	7.2%		108819	108.82	0.419
13	SUFFOLK	663906	11.0%		165977	165.98	0.638
14	WORCESTER	709705	11.8%		177426	177.43	0.682
	STATE	6016425	100.0%		1504106	1504.11	5.785

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 23%

EMISSION FACTORS : VOC: 0.5 LB
EMISSION FACTOR UNITS : PERSON VOL.1 T.4.3.6

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-7

NON-INDUSTRIAL SURFACE COATING VOC EMISSIONS 1990

scoat90

COUNT	POP 1990	1 ARCH.COAT EF P.CAP 4.6LB/YR VOC TPY	/365 * 1.4 TPSD	AUTO-REF POPUL 2.3LB VOC TPY	/52*5 AUTO REF UNIFORM TPSD	3 TRAFFIC M EF P.CAP 0.5LB/YR VOC TPY	/260 TRAF M EF P.EMP TPSD	TOTAL NON-INDUS SURFACE COATING VOC TPY	TOTAL NON-INDU SURFACE COATING VOC TPSD
BARNS	186605	429.19	1.646	214.60	0.825	46.65	0.179	690.44	2.651
BERKS	139352	320.51	1.229	160.25	0.616	34.84	0.134	515.60	1.980
BRIST	506325	1164.55	4.467	582.27	2.240	126.58	0.487	1873.40	7.193
DUKES	11639	26.77	0.103	13.38	0.051	2.91	0.011	43.06	0.165
ESSEX	670080	1541.18	5.911	770.59	2.964	167.52	0.644	2479.30	9.520
FRANK	70092	161.21	0.618	80.61	0.310	17.52	0.067	259.34	0.996
HAMPD	456310	1049.51	4.026	524.76	2.018	114.08	0.439	1688.35	6.483
HAMPS	146568	337.11	1.293	168.55	0.648	36.64	0.141	542.30	2.082
MIDDL	1398468	3216.48	12.337	1608.24	6.186	349.62	1.345	5174.33	19.867
NANTU	6012	13.83	0.053	6.91	0.027	1.50	0.006	22.24	0.085
NORFO	616087	1417.00	5.435	708.50	2.725	154.02	0.592	2279.52	8.752
PLYMO	435276	1001.13	3.840	500.57	1.925	108.82	0.419	1610.52	6.184
SUFFO	663906	1526.98	5.857	763.49	2.937	165.98	0.638	2456.45	9.432
WORCE	709705	1632.32	6.261	816.16	3.139	177.43	0.682	2625.91	10.082
STATE	6016425	13837.78	53.076	6918.89	26.611	1504.11	5.785	22260.77	85.473
STATEQC		13837.78	53.076	6918.89	26.611	1504.106	5.785	22260.77	85.473

TABLE B.3-8

INDUSTRIAL SURFACE COATING VOC EMISSIONS 1990

scoatind3

		1 FURNITURE AND FIXTURES						2 METAL CONTAINERS				3 MOTOR VEHICLES NEW		4 MACHINERY AND EQUIPMENT			
COUNTIES	POP 1990	SIC25 EMPL CBP	EF EMP 1311LB VOC TPY	SSEIS POINT >10TPY	EST SSEIS EMPL	EST NET EMPL	EST NET AREA VOC TPY	EF PCAP 1.3 LB VOC TPY	SSEIS PT>10 TPY	EST NET POPUL	EST NET AREA VOC TPY	SIC 3711 /3/5	NET AREA EF 793.9	SIC 35 EMPL	EF/EMPL 77 LB VOC TPY	SSEIS SIC35 TPY	NET AREA TPY
BARNSTAB	186605	0	0.00	0	0.0	0.0	0.00	121.29	0	186605	121.29	0	0.00	110	4.24	0	4.24
BERKSHIR	139352	0	0.00	0	0.0	0.0	0.00	90.58	0	139352	90.58	0	0.00	1412	54.36	0	54.36
BRISTOL	506325	304	199.27	10	21.2	282.8	185.38	329.11	0	506325	329.11	204	80.98	2542	97.87	44	53.87
DUKES	11639	0	0.00	0	0.0	0.0	0.00	7.57	0	11639	7.57	0	0.00	0	0.00	0	0.00
ESSEX	670080	488	319.88	112	237.3	250.7	164.34	435.55	233	311618.4	202.55	7843	3113.28	7855	302.42	0	302.42
FRANKLIN	70092	210	137.66	12	25.4	184.6	120.99	45.56	0	70092	45.56	0	0.00	651	25.06	0	25.06
HAMPDEN	456310	310	203.21	0	0.0	310.0	203.21	296.60	0	456310	296.60	692	274.69	6648	255.95	16	239.95
HAMPSHIR	146568	117	76.69	0	0.0	117.0	76.69	95.27	0	146568	95.27	0	0.00	439	16.90	0	16.90
MIDDLESE	1398468	844	553.24	48	101.7	742.3	486.58	909.00	26	1358468	883.00	7800	3096.21	38997	1501.4	70	1431.4
NANTUCKE	6012	0	0.00	0	0.0	0.0	0.00	3.91	0	6012	3.91	0	0.00	0	0.00	0	0.00
NORFOLK	616087	580	380.19	21	44.5	535.5	351.03	400.46	0	616087	400.46	154	61.13	5265	202.70	47	155.70
PLYMOUTH	435276	220	144.21	0	0.0	220.0	144.21	282.93	0	435276	282.93	184	73.04	2020	77.77	0	77.77
SUFFOLK	663906	708	464.09	0	0.0	708.0	464.09	431.54	0	663906	431.54	28	11.11	2203	84.82	0	84.82
WORCESTE	709705	2834	1857.69	219	464.0	2370.0	1553.55	461.31	0	709705	461.31	254	100.83	12648	486.95	82	404.95
STATE	6016425	6615	4336.13	422	894.1	5720.9	3750.07	3910.7	259	5617963.	3651.68	17159	6811.27	80790	3110.4	259	2851.4
STATE	QC	6615	4336.13	422	894.1	5720.9	3750.07	3910.6	259			17159	6811.26	80790	3110.4	259	2851.4

TABLE B.3-8 (Cont'd)

INDUSTRIAL SURFACE COATING VOC EMISSIONS 1990

scoatind3

	5 APPLIANCES		6 OTHER TRANSPORTATION EQPT				7 SHEET, STRIP & COIL				8 FACTORY FIN. WOOD				9 ELECTRICAL INSULATION			
COUNT	SIC 363 EMPL	EF/EMPL EF 463LB TPY	SIC 37 EX 3,11 EMPL	EF/EMPL EF 35 LB TPY	SSEIS SIC 37 EX 3,11	NET AREA TPY	SIC 3479 EMPLOY	EF/EMPL EF 2877 TPY	SSEIS SIC 3479	NET AREA TPY	SIC 242 243-5,9 EMPL	EF/EMP 633.95 TPY	SSEIS EMISS 24	NET AREA TPY	SIC 3357 3612 EMPL	EF/EMPL EF 290 TPY	SSEIS SIC3357 3612	NET AREA TPY
====	======	========	=======	========	=======	=====	=======	=======	======	=====	======	======	======	=====	=======	=======	=======	=====
BARNS	0	0.00	0	0.00		0.00	0	0.00	0	0.00	101	32.02	0	32.02	0	0.00	0	0.00
BERKS	0	0.00	0	0.00		0.00	249	358.19	0	358.19	154	48.82	0	48.82	748	108.46	31	77.46
BRIST	0	0.00	204	3.57		3.57	84	120.83	0	120.83	679	215.24	59	156.24	887	128.62	0	128.62
DUKES	0	0.00	0	0.00		0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
ESSEX	60	13.89	7843	137.25		137.3	101	145.29	13	132.29	297	94.15	0	94.15	0	0.00	0	0.00
FRANK	0	0.00	0	0.00		0.00	0	0.00	0	0.00	433	137.26	0	137.26	249	36.11	0	36.11
HAMPD	309	71.53	0	0.00	* 65	0.00	99	142.41	86	56.41	336	106.51	0	106.51	249	36.11	0	36.11
HAMPS	0	0.00	0	0.00		0.00	0	0.00	0	0.00	249	78.93	44	34.93	541	78.45	0	78.45
MIDDL	0	0.00	7800	136.50	51	85.50	471	677.53	94	583.53	1147	363.60	0	363.60	2704	392.08	25	367.08
NANTU	0	0.00	0	0.00		0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
NORFO	0	0.00	154	2.70		2.70	175	251.74	20	231.74	580	183.86	0	183.86	0	0.00	0	0.00
PLYMO	175	40.51	184	3.22		3.22	20	28.77	11	17.77	569	180.37	39	141.37	0	0.00	0	0.00
SUFFO	0	0.00	28	0.49		0.49	0	0.00	0	0.00	249	78.93	0	78.93	0	0.00	0	0.00
WORCE	0	0.00	254	4.45		4.45	261	375.45	0	375.45	793	251.38	13	238.38	1726	250.27	11	239.27
-----------	------	------	------	------	------	-----	------	------	------	------	---------	-----	------	-----	------	------	------	------
STATE	544	125.94	16467	288.17		237.1	1460	21[illegible]	224	1876.2	5587	1771.1	155	1616.1	7104	1030.08	67	963.08
STATE	544	125.936 0	16467	288.1725	51	237.1	1460	21[illegible]	224	1876.2	5587	1771.1	155	1616.0	7104	1030.08	67	963.08

TABLE B.3-8 (Cont'd)

INDUSTRIAL SURFACE COATING VOC EMISSIONS 1990

TOTAL INDUSTRIAL A VOC EMISS

scoatind3

COUNT	10 OTHER PROD COATING EF PCAP 0.6 LB VOC TPY	11 HIGH PERF MAINTEN EF PCAP 0.8 LB VOC TPY	12 MARINE COATINGS SIC 373 EMPL	EF/EMPL EF 308 TPY	13 O.SP PURP COATING EF PCAP 0.8 LB VOC TPY	scoatind3 COUNTIES	TOTAL INDUSTR SURFACE COATING VOC TPY	/52*5 TOTAL INDUSTR SURFACE COATING VOC TPSD
BARNS	55.98	74.64	135	20.79	74.64	BARNSTAB	383.60	1.475
BERKS	41.81	55.74	0	0.00	55.74	BERKSHIR	782.69	3.010
BRIST	151.90	202.53	409	62.99	202.53	BRISTOL	1678.55	6.456
DUKES	3.49	4.66	0	0.00	4.66	DUKES	20.37	0.078
ESSEX	201.02	268.03	130	20.02	268.03	ESSEX	4917.28	18.913
FRANK	21.03	28.04	0	0.00	28.04	FRANKLIN	442.08	1.700
HAMPD	136.89	182.52	0	0.00	182.52	HAMPDEN	1786.95	6.873
HAMPS	43.97	58.63	0	0.00	58.63	HAMPSHIR	463.47	1.783
MIDDL	419.54	559.39	0	0.00	559.39	MIDDLESE	8835.21	33.982
NANTU	1.80	2.40	0	0.00	2.40	NANTUCKE	10.52	0.040
NORFO	184.83	246.43	0	0.00	246.43	NORFOLK	2064.30	7.940
PLYMO	130.58	174.11	882	135.83	174.11	PLYMOUTH	1395.46	5.367
SUFFO	199.17	265.56	331	50.97	265.56	SUFFOLK	1852.26	7.124
WORCE	212.91	283.88	0	0.00	283.88	WORCESTE	4158.85	15.996
.....	......	......	......	......	......	......	....	......
STATE	1804.93	2406.57	1887	290.6	2406.57	STATE	28791.57	110.737
STATE	1804.927 0	2406.57	1887	290.6	2406.57	STATE	28791.57	110.737

TABLE B.3-9

furnfix3

#1

TOTAL FURNITURE AND FIXTURE VOC EMISSIONS 1990

16 SCC : 24-01-020-000

STATEWIDE ACTIVITY 5,721 EMPLOYEES (CODE 25)

	COUNTY ACTIVITY LEVEL : COUNTIES	NET TOTAL EMPLOY SIC 25	OZ PO ACTIV /260*65	VOC TPY EM.FAC 1311LB/EMP	VOC PO TPSD /65
1	BARNSTABLE	0.0	0	0.00	0.000
2	BERKSHIRE	0.0	0	0.00	0.000
3	BRISTOL	282.8	71	185.38	0.713
4	DUKES	0.0	0	0.00	0.000
5	ESSEX	250.7	63	164.33	0.632
6	FRANKLIN	184.6	46	121.01	0.465
7	HAMPDEN	310.0	78	203.21	0.782
8	HAMPSHIRE	117.0	29	76.69	0.295
9	MIDDLESEX	742.3	186	486.58	1.871
10	NANTUCKET	0.0	0	0.00	0.000
11	NORFOLK	535.5	134	351.02	1.350
12	PLYMOUTH	220.0	55	144.21	0.555
13	SUFFOLK	708.0	177	464.09	1.785
14	WORCESTER	2370.0	593	1553.54	5.975
	STATE	5721	1430	3750.05	14.423

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD : CODE 371

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 1311 LB
EMISSION FACTOR UNITS : LB/EMPLOY AMS SHORTLIST P.2 JULY 92

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-10

metcont3

#2

TOTAL SURFACE COAT METAL CONTAINERS VOC EMISSIONS 1990

17 SCC : 24-01-040-000

(POPULATION EQUIVALENT TO POINT SOURCE SUBTRACTED)

STATEWIDE ACTIVITY 5,617,963 NET POPULATION

	COUNTY ACTIVITY LEVEL : COUNTIES	NET TOTAL POPUL	OZ PO ACTIV /260*65	VOC TPY EM.FAC 1.3 LB/POP	VOC PO TPSD /65
1	BARNSTABLE	186605	46651	121.29	0.467
2	BERKSHIRE	139352	34838	90.58	0.348
3	BRISTOL	506325	126581	329.11	1.266
4	DUKES	11639	2910	7.57	0.029
5	ESSEX	311619	77905	202.55	0.779
6	FRANKLIN	70092	17523	45.56	0.175
7	HAMPDEN	456310	114078	296.60	1.141
8	HAMPSHIRE	146568	36642	95.27	0.366
9	MIDDLESEX	1358468	339617	883.00	3.396
10	NANTUCKET	6012	1503	3.91	0.015
11	NORFOLK	616087	154022	400.46	1.540
12	PLYMOUTH	435276	108819	282.93	1.088
13	SUFFOLK	663906	165977	431.54	1.660
14	WORCESTER	709705	177426	461.31	1.774
	STATE	5617964	1404491	3651.68	14.045

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 1.3 LB
EMISSION FACTOR UNITS : LB/CAPITA VOL.1 T.4.3-6

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)
CBP EMPLOYMENT DATA INSUFFICIENT, POPULATION USED

TABLE B.3-11

transpeq3

#3

TOTAL SURFACE COATING MOTOR VEHICLES VOC EMISSIONS 1990

18 SCC : 24-01-070-000

STATEWIDE ACTIVITY SIC 3711, 3713, 3715

COUNTY ACTIVITY LEVEL :

	COUNTIES ========	EMPLOY SIC363	SSEIS TPY	NET TOTAL EMPLOY .397 TON =======	OZ PO ACTIV /260*65 ======	VOC TPY EM.FAC 793.9LB/EMPL =========	VOC PO TPSD /65 ======
1	BARNSTABLE	0	0	0	0	0.00	0.000
2	BERKSHIRE	0	0	0	0	0.00	0.000
3	BRISTOL	204	0	204	51	80.98	0.311
4	DUKES	0	0	0	0	0.00	0.000
5	ESSEX	7843	0	7843	1961	3113.28	11.974
6	FRANKLIN	0	0	0	0	0.00	0.000
7	HAMPDEN	692	0	692	173	274.69	1.056
8	HAMPSHIRE	0	0	0	0	0.00	0.000
9	MIDDLESEX	7800	0	7800	1950	3096.21	11.909
10	NANTUCKET	0	0	0	0	0.00	0.000
11	NORFOLK	154	0	154	39	61.13	0.235
12	PLYMOUTH	184	0	184	46	73.04	0.281
13	SUFFOLK	28	0	28	7	11.11	0.043
14	WORCESTER	254	0	254	64	100.83	0.388
				0			
	STATE	17159	0	17159	4290	6811.27	26.197

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 793.9
EMISSION FACTOR UNITS : LB/EMPLOY AMS SHORTLIST

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-12

macheqpt #4

TOTAL SURFACE COAT MACHINERY AND EQUIPMENT VOC EMISSIONS 1990

19 SCC : 24-01-055-000

STATEWIDE ACTIVITY

COUNTY ACTIVITY LEVEL :

	COUNTIES	EMPLOY SIC35	SSEIS VOC TPY	NET TOTAL EMPLOY -26EMP/TN	OZ PO ACTIV /260*65	VOC TPY EM.FAC 77 LB/EMPL	VOC PO TPSD /65
1	BARNSTABLE	110	0	110	28	4.24	0.016
2	BERKSHIRE	1412	0	1412	353	54.36	0.209
3	BRISTOL	2542	44	1399	350	53.87	0.207
4	DUKES	0	0	0	0	0.00	0.000
5	ESSEX	7855	0	7855	1964	302.42	1.163
6	FRANKLIN	651	0	651	163	25.06	0.096
7	HAMPDEN	6648	16	6232	1558	239.95	0.923
8	HAMPSHIRE	439	0	439	110	16.90	0.065
9	MIDDLESEX	38997	70	37179	9295	1431.38	5.505
10	NANTUCKET	0	0	0	0	0.00	0.000
11	NORFOLK	5265	47	4044	1011	155.70	0.599
12	PLYMOUTH	2020	0	2020	505	77.77	0.299
13	SUFFOLK	2203	0	2203	551	84.82	0.326
14	WORCESTER	12648	82	10518	2630	404.95	1.557
	STATE	80790	259	74063	18516	2851.42	10.967

2000/77 25.974 EMP

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 77 LB
EMISSION FACTOR UNITS : LB/EMPLOYE VOL.1 T.4.3-6, AMS SHORTLIST

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-13

applianc3
nov 2 93 #5

TOTAL SURFACE COATING LARGE APPLIANCES VOC EMISSIONS 1990

20 SCC : 24-01-060-000

STATEWIDE ACTIVITY: EMPLOYMENT SIC 363

COUNTY ACTIVITY LEVEL :

	COUNTIES	EMPLOY	SSEIS TPY	NET TOTAL EMPLOY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 463 LB/EMP	VOC PO TPSD /65
1	BARNSTABLE	0	0	0	0	0.00	0.000
2	BERKSHIRE	0	0	0	0	0.00	0.000
3	BRISTOL	0	0	0	0	0.00	0.000
4	DUKES	0	0	0	0	0.00	0.000
5	ESSEX	60	0	60	15	13.89	0.053
6	FRANKLIN	0	0	0	0	0.00	0.000
7	HAMPDEN	309	0	309	77	71.53	0.275
8	HAMPSHIRE	0	0	0	0	0.00	0.000
9	MIDDLESEX	0	0	0	0	0.00	0.000
10	NANTUCKET	0	0	0	0	0.00	0.000
11	NORFOLK	0	0	0	0	0.00	0.000
12	PLYMOUTH	175	0	175	44	40.51	0.156
13	SUFFOLK	0	0	0	0	0.00	0.000
14	WORCESTER	0	0	0	0	0.00	0.000
	STATE	544	0	544	136	125.94	0.484

ACTIVITY LEVEL UNITS : EMPLOYMENT CODE 371
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 463 LB CODE 560
EMISSION FACTOR UNITS : LB/EMPLOY EPA VOL.1 T.4.3-6
& AMS SHORTLIST
RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1.0 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-14

otransct6b
nov 2 93 #6

TOTAL SURFACE COAT OTHER TRANSPORTATION EQUIPMENT
VOC EMISSIONS 1990

21 SCC : NO AMS SCC CODE using 24-01-990-000 as surrogate

STATEWIDE ACTIVITY: EMPLOYMENT SIC 37 EX 373,3711

COUNTY ACTIVITY LEVEL :

	COUNTIES	EMPLOY	SSEIS TPY	NET TOTAL EMPLOY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 35 LB/EMP	VOC PO TPSD /65
1	BARNSTABLE	0	0	0	0	0.00	0.000
2	BERKSHIRE	0	0	0	0	0.00	0.000
3	BRISTOL	204	0	204	51	3.57	0.014
4	DUKES	0	0	0	0	0.00	0.000
5	ESSEX	7843	0	7843	1961	137.25	0.528
6	FRANKLIN	0	0	0	0	0.00	0.000
7	HAMPDEN	0	0	0	0	0.00	0.000
8	HAMPSHIRE	0	0	0	0	0.00	0.000
9	MIDDLESEX	7800	0	7800	1950	136.50	0.525
10	NANTUCKET	0	0	0	0	0.00	0.000
11	NORFOLK	154	0	154	39	2.70	0.010
12	PLYMOUTH	184	0	184	46	3.22	0.012
13	SUFFOLK	28	0	28	7	0.49	0.002
14	WORCESTER	254	0	254	64	4.45	0.017
	STATE	16467	0	16467	4117	288.17	1.108

ACTIVITY LEVEL UNITS : EMPLOYMENT CODE 371
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 35 LB CODE 560
EMISSION FACTOR UNITS : LB/EMPLOY EPA VOL.1 T.4.3-6

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1.0 SAT : 0 SUN : 0

COMMENTS: NO AMS SCC CODE using 24-01-990-000 as surrogate

TABLE B.3-15

metcoil3
nov 2 93 #7

TOTAL SURFACE COATING METAL COIL VOC EMISSIONS 1990

22 SCC : 24-01-045-000

0.6952 EMP = 1 TON
STATEWIDE ACTIVITY: EMPLOYMENT SIC 3479 2877 LB /EMP

COUNTY ACTIVITY LEVEL :

	COUNTIES	EMPLOY	SSEIS TPY	NET TOTAL EMPLOY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 2877 LB/EMP	VOC PO TPSD /65
1	BARNSTABLE	0	0	0	0	0.00	0.000
2	BERKSHIRE	249	0	249	62	358.19	1.378
3	BRISTOL	84	0	84	21	120.83	0.465
4	DUKES	0	0	0	0	0.00	0.000
5	ESSEX	101	13	92	23	132.29	0.509
6	FRANKLIN	0	0	0	0	0.00	0.000
7	HAMPDEN	99	86	39	10	56.41	0.217
8	HAMPSHIRE	0	0	0	0	0.00	0.000
9	MIDDLESEX	471	94	406	101	583.53	2.244
10	NANTUCKET	0	0	0	0	0.00	0.000
11	NORFOLK	175	20	161	40	231.74	0.891
12	PLYMOUTH	20	11	12	3	17.77	0.068
13	SUFFOLK	0	0	0	0	0.00	0.000
14	WORCESTER	261	0	261	65	375.45	1.444
	STATE	1460	224	1304	326	1876.20	7.216

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 2877 LB
EMISSION FACTOR UNITS : LB/EMPLOY EPA VOL.1 T.4.3-6

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1.0 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-16

facfwood3

#8

TOTAL SURFACE COATING FACTORY FINISH WOOD VOC EMISSIONS 1990

23 SCC : 24-01-015-000

SSEIS : 155 TON VOC / 489 EMPLOYEES = 0.3170 TON/EMP
= 633.95 LB/EMP

STATEWIDE ACTIVITY: EMPLOYMENT SIC 2426-29, 243-45, 2492,2499

COUNTY ACTIVITY LEVEL :

	COUNTIES	EMPLOY SIC363	SSEIS TPY	NET TOTAL EMPLOY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 634 LB/EMPL	VOC PO TPSD /65
1	BARNSTABLE	101	0	101	25	32.02	0.123
2	BERKSHIRE	154	0	154	39	48.82	0.188
3	BRISTOL	679	59	493	123	156.24	0.601
4	DUKES	0	0	0	0	0.00	0.000
5	ESSEX	297	0	297	74	94.15	0.362
6	FRANKLIN	433	0	433	108	137.26	0.528
7	HAMPDEN	336	0	336	84	106.51	0.410
8	HAMPSHIRE	249	44	110	28	34.93	0.134
9	MIDDLESEX	1147	0	1147	287	363.60	1.398
10	NANTUCKET	0	0	0	0	0.00	0.000
11	NORFOLK	580	39	457	114	144.86	0.557
12	PLYMOUTH	569	0	569	142	180.37	0.694
13	SUFFOLK	249	0	249	62	78.93	0.304
14	WORCESTER	793	13	752	188	238.38	0.917
	STATE	5587	155	5098	1275	1616.08	6.216

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 634 LB
EMISSION FACTOR UNITS : LB/EMPLOY AMS SHORTLIST

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-17

elecinsu3
nov 2 93 #9

TOTAL SURFACE COATING ELECTRICAL INSULATION VOC EMISSIONS 1990

24SCC : 24-01-065-000

6.9 EMP = 1 TON

STATEWIDE ACTIVITY: EMPLOYMENT SIC 3357 290 LB /EMP

COUNTY ACTIVITY LEVEL :

	COUNTIES	EMPLOY	SSEIS TPY	NET TOTAL EMPLOY	3612 OZ PO ACTIV /260*65	VOC TPY EM.FAC 290 LB/EMP	VOC PO TPSD /65
1	BARNSTABLE	0	0	0	0	0.00	0.000
2	BERKSHIRE	748	31	534	134	77.46	0.298
3	BRISTOL	887	0	887	222	128.62	0.495
4	DUKES	0	0	0	0	0.00	0.000
5	ESSEX	0	0	0	0	0.00	0.000
6	FRANKLIN	249	0	249	62	36.11	0.139
7	HAMPDEN	249	0	249	62	36.11	0.139
8	HAMPSHIRE	541	0	541	135	78.45	0.302
9	MIDDLESEX	2704	25	2532	633	367.08	1.412
10	NANTUCKET	0	0	0	0	0.00	0.000
11	NORFOLK	0	0	0	0	0.00	0.000
12	PLYMOUTH	0	0	0	0	0.00	0.000
13	SUFFOLK	0	0	0	0	0.00	0.000
14	WORCESTER	1726	11	1650	413	239.27	0.920
	STATE	7104	67	6642	1660	963.08	3.704

ACTIVITY LEVEL UNITS : EMPLOYMENT CODE 371
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 290 LB CODE 560
EMISSION FACTOR UNITS : LB/EMPLOY EPA VOL.1 T.4.3-6
AMS SHORTLIST
RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1.0 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-18

oprodct6b

#10

INDUSTRIAL SURFACE COATING OTHER PRODUCT SURFACE COAT
VOC EMISSIONS 1990

25 SCC : 24-01-090-000

STATE ACTIVITY LEVEL : 6,016,425 POPULATION

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	SSEIS EMPLOY	ANNUAL ACTIVITY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 0.6 LB/CAP	VOC PO TPSD /92
1	BARNSTABLE	186605	0	186605	46651	55.98	0.215
2	BERKSHIRE	139352	0	139352	34838	41.81	0.161
3	BRISTOL	506325	0	506325	126581	151.90	0.584
4	DUKES	11639	0	11639	2910	3.49	0.013
5	ESSEX	670080	0	670080	167520	201.02	0.773
6	FRANKLIN	70092	0	70092	17523	21.03	0.081
7	HAMPDEN	456310	0	456310	114078	136.89	0.527
8	HAMPSHIRE	146568	0	146568	36642	43.97	0.169
9	MIDDLESEX	1398468	0	1398468	349617	419.54	1.614
10	NANTUCKET	6012	0	6012	1503	1.80	0.007
11	NORFOLK	616087	0	616087	154022	184.83	0.711
12	PLYMOUTH	435276	0	435276	108819	130.58	0.502
13	SUFFOLK	663906	0	663906	165977	199.17	0.766
14	WORCESTER	709705	0	709705	177426	212.91	0.819
	STATE	6016425	0	6016425	1504106	1804.93	6.942

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PO THRUPUT : 25%
WEEKS PER YEAR : 52
EMISSION FACTORS : VOC: 0.6 LB/CAP CODE 565
EMISSION FACTOR UNITS : PERSON VOL.1 SEC.4.3.7, AMS SHORTLIST

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1.0 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-19

hiprodmt6B

#11

INDUSTRIAL SURFACE COATING HIGH PERFORMANCE MAINTENANCE (INDUSTRIAL MAINTENANCE IN AMS SHORTLIST) VOC EMISSIONS 1990

1bSCC : 24-01-100-000

STATE ACTIVITY LEVEL : 6,016,425 POPULATION

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	SSEIS EMPLOY	ANNUAL ACTIVITY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 0.8 LB/CAP	VOC PO TPSD /92
1	BARNSTABLE	186605	0	186605	46651	74.64	0.287
2	BERKSHIRE	139352	0	139352	34838	55.74	0.214
3	BRISTOL	506325	0	506325	126581	202.53	0.779
4	DUKES	11639	0	11639	2910	4.66	0.018
5	ESSEX	670080	0	670080	167520	268.03	1.031
6	FRANKLIN	70092	0	70092	17523	28.04	0.108
7	HAMPDEN	456310	0	456310	114078	182.52	0.702
8	HAMPSHIRE	146568	0	146568	36642	58.63	0.225
9	MIDDLESEX	1398468	0	1398468	349617	559.39	2.151
10	NANTUCKET	6012	0	6012	1503	2.40	0.009
11	NORFOLK	616087	0	616087	154022	246.43	0.948
12	PLYMOUTH	435276	0	435276	108819	174.11	0.670
13	SUFFOLK	663906	0	663906	165977	265.56	1.021
14	WORCESTER	709705	0	709705	177426	283.88	1.092
	STATE	6016425	0	6016425	1504106	2406.57 ✓	9.256

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PO THRUPUT : 25%
WEEKS PER YEAR : 52
EMISSION FACTORS : VOC: 0.8 LB code 565
EMISSION FACTOR UNITS : PERSON VOL.1 SEC.4.3.7, AMS SHORTLIST

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1.0 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-20

shipaint3

#12

TOTAL SURFACE COATING -MARINE VOC EMISSIONS 1990

21 SCC : 24-01-080-000

STATEWIDE ACTIVITY SIC 373

COUNTY ACTIVITY LEVEL :

	COUNTIES	EMPLOY SIC373	SSEIS TPY	NET TOTAL EMPLOY .154 TON	OZ PO ACTIV /260*65	VOC TPY EM.FAC 308 LB/EMPL	VOC PO TPSD /65
1	BARNSTABLE	135	0	135	34	20.79	0.080
2	BERKSHIRE	0	0	0	0	0.00	0.000
3	BRISTOL	409	0	409	102	62.99	0.242
4	DUKES	0	0	0	0	0.00	0.000
5	ESSEX	130	0	130	33	20.02	0.077
6	FRANKLIN	0	0	0	0	0.00	0.000
7	HAMPDEN	0	0	0	0	0.00	0.000
8	HAMPSHIRE	0	0	0	0	0.00	0.000
9	MIDDLESEX	0	0	0	0	0.00	0.000
10	NANTUCKET	0	0	0	0	0.00	0.000
11	NORFOLK	0	0	0	0	0.00	0.000
12	PLYMOUTH	886	28	882	220	135.78	0.522
13	SUFFOLK	331	0	331	83	50.97	0.196
14	WORCESTER	0	0	0	0	0.00	0.000
	STATE	1891	28	1887	472	290.55	1.117

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
WEEKS/YEAR : 52 PO THRUPUT : 25 %

EMISSION FACTORS : VOC: 308 LB
EMISSION FACTOR UNITS : LB/EMPLOY AMS SHORTLIST

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-21

ospurpct6b

#13

INDUSTRIAL SURFACE COATING OTHER SPECIAL PURPOSE COATING VOC EMISSIONS 1990

28 SCC : 24-01-200-000

STATE ACTIVITY LEVEL : 6,016,425 POPULATION

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	SSEIS EMPLOY	ANNUAL ACTIVITY	OZ PO ACTIV /260*65	VOC TPY EM.FAC 0.8 LB/CAP	VOC PO TPSD /92
1	BARNSTABLE	186605	0	186605	46651	74.64	0.287
2	BERKSHIRE	139352	0	139352	34838	55.74	0.214
3	BRISTOL	506325	0	506325	126581	202.53	0.779
4	DUKES	11639	0	11639	2910	4.66	0.018
5	ESSEX	670080	0	670080	167520	268.03	1.031
6	FRANKLIN	70092	0	70092	17523	28.04	0.108
7	HAMPDEN	456310	0	456310	114078	182.52	0.702
8	HAMPSHIRE	146568	0	146568	36642	58.63	0.225
9	MIDDLESEX	1398468	0	1398468	349617	559.39	2.151
10	NANTUCKET	6012	0	6012	1503	2.40	0.009
11	NORFOLK	616087	0	616087	154022	246.43	0.948
12	PLYMOUTH	435276	0	435276	108819	174.11	0.670
13	SUFFOLK	663906	0	663906	165977	265.56	1.021
14	WORCESTER	709705	0	709705	177426	283.88	1.092
	STATE	6016425	0	6016425	1504106	2406.57	9.256

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 5
PO THRUPUT : 25%
WEEKS PER YEAR : 52
EMISSION FACTORS : VOC: 0.8 LB code 565
EMISSION FACTOR UNITS : PERSON VOL.1 SEC.4.3.7, AMS SHORTLIST

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1.0 SAT : 0 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-22

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graphart3

         29 GRAPHIC ARTS  VOC EMISSIONS 1990

    SCC :      24-25-000-000

    STATE ACTIVITY LEVEL :      6,016,425   POPULATION

    COUNTY ACTIVITY LEVEL :        ANNUAL    OZ PO        VOC TPY  VOC PO
    ----------------------       ACTIVITY   ACTIV         EM.FAC    TPSD
    COUNTIES    POP 1990 SSEIS  .7692CAP  /260*65      1.3LB/CAP    /65
    ========   ========= EMPLOY  =======    ======      =========  ======
  1 BARNSTABLE    186605      0   186605    46651         121.29   0.467
  2 BERKSHIRE     139352      0   139352    34838          90.58   0.348
  3 BRISTOL       506325     50   429402   107351         279.11   1.074
  4 DUKES          11639      0    11639     2910           7.57   0.029
  5 ESSEX         670080     60   577772   144443         375.55   1.444
  6 FRANKLIN       70092      0    70092    17523          45.56   0.175
  7 HAMPDEN       456310     41   393233    98308         255.60   0.983
  8 HAMPSHIRE     146568      0   146568    36642          95.27   0.366
  9 MIDDLESEX    1398468    351   858469   214617         558.00   2.146
 10 NANTUCKET       6012      0     6012     1503           3.91   0.015
 11 NORFOLK       616087     85   485318   121329         315.46   1.213
 12 PLYMOUTH      435276    113   261430    65358         169.93   0.654
 13 SUFFOLK       663906    103   505445   126361         328.54   1.264
 14 WORCESTER     709705     18   682013   170503         443.31   1.705

    STATE        6016425    821  4753349  1188337        3089.68  11.883

ACTIVITY LEVEL UNITS :         POPULATION
ACTIVITY LEVEL PROCESS :                  CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK :              5
                                          PO THRUPUT : 25%
WEEKS PER YEAR   :               52
EMISSION FACTORS :      VOC:     1.3
EMISSION FACTOR UNITS :        PERSON     VOL.1 SEC.4.3.7, AMS SHORTLIST

RULE EFFECTIVENESS :             N/A
RULE PENETRATION :               N/A
SIP RULE :                       NO

PO INTERVAL :                    1 HR
WEEKDAY:      1         SAT :  0          SUN :     0

COMMENTS:      SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)
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TABLE B.3-23

3casphal

CUTBACK ASPHALT PAVING VOC EMISSIONS 1990

30 SCC : 24-61-021-000

156.76 TONS *2000 LB =313520 LB VOC

STATE ACTIVITY LEVEL : 6,016,425 POP = 0.052111 LB/CAP

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	SSEIS EMISS	ANNUAL ACTIVITY	OZ PO ACTIV /365*92	VOC TPY EM.FAC .0521 LB/CAP	VOC PO TPSD /92
1	BARNSTABLE	186605	0	186605	47035	4.86	0.013
2	BERKSHIRE	139352	0	139352	35124	3.63	0.010
3	BRISTOL	506325	0	506325	127622	13.19	0.036
4	DUKES	11639	0	11639	2934	0.30	0.001
5	ESSEX	670080	0	670080	168897	17.46	0.048
6	FRANKLIN	70092	0	70092	17667	1.83	0.005
7	HAMPDEN	456310	0	456310	115015	11.89	0.033
8	HAMPSHIRE	146568	0	146568	36943	3.82	0.010
9	MIDDLESEX	1398468	0	1398468	352491	36.44	0.100
10	NANTUCKET	6012	0	6012	1515	0.16	0.000
11	NORFOLK	616087	0	616087	155288	16.05	0.044
12	PLYMOUTH	435276	0	435276	109713	11.34	0.031
13	SUFFOLK	663906	0	663906	167341	17.30	0.047
14	WORCESTER	709705	0	709705	178885	18.49	0.051
	STATE	6016425	0	6016425	1516469	156.76	0.429

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PO THRUPUT : 25.2%
WEEKS PER YEAR : 52
EMISSION FACTORS : VOC: 0.052111 LB/CAP
EMISSION FACTOR UNITS : PERSON VOL.1 SEC.4.3.5, ADJUSTED TO POPULATION

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-24

Casphalt3

EMULSIFIED ASPHALT PAVING VOC EMISSIONS 1990

31 SCC : 24-61-022-000

STATE ACTIVITY LEVEL : 6,016,425 POP = 0.004 LB/CAP

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	SSEIS EMPLOY	ANNUAL ACTIVITY	OZ PO ACTIV /365*92	VOC TPY EM.FAC 0.004LB/CAP	VOC PO TPSD /92
1	BARNSTABLE	186605	0	186605	47035	0.37	0.001
2	BERKSHIRE	139352	0	139352	35124	0.28	0.001
3	BRISTOL	506325	0	506325	127622	1.01	0.003
4	DUKES	11639	0	11639	2934	0.02	0.000
5	ESSEX	670080	0	670080	168897	1.34	0.004
6	FRANKLIN	70092	0	70092	17667	0.14	0.000
7	HAMPDEN	456310	0	456310	115015	0.91	0.003
8	HAMPSHIRE	146568	0	146568	36943	0.29	0.001
9	MIDDLESEX	1398468	0	1398468	352491	2.80	0.008
10	NANTUCKET	6012	0	6012	1515	0.01	0.000
11	NORFOLK	616087	0	616087	155288	1.23	0.003
12	PLYMOUTH	435276	0	435276	109713	0.87	0.002
13	SUFFOLK	663906	0	663906	167341	1.33	0.004
14	WORCESTER	709705	0	709705	178885	1.42	0.004
	STATE	6016425	0	6016425	1516469	12.03	0.033

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PO THRUPUT : 25.2%
WEEKS PER YEAR : 52
EMISSION FACTORS : VOC: 0.004 LB
EMISSION FACTOR UNITS : LB/PERSON VOL.1 SEC.4.3.7, EPA COMMENTS EPA/OMS SHORTLIST
RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-25

3conssolv

COMMERCIAL/CONSUMER SOLVENT USE VOC EMISSIONS 1990

sep 8 93

32 SCC : 24-65-000-000

STATE ACTIVITY LEVEL : 6,016,425

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	SSEIS EMISS	ANNUAL ACTIVITY	OZ PO ACTIV /365*92	VOC TPY EM.FAC 6.3 LB/CAP	VOC PO TPSD /92
1	BARNSTABLE	186605	0	186605	47035	587.81	1.610
2	BERKSHIRE	139352	0	139352	35124	438.96	1.203
3	BRISTOL	506325	0	506325	127622	1594.92	4.370
4	DUKES	11639	0	11639	2934	36.66	0.100
5	ESSEX	670080	0	670080	168897	2110.75	5.783
6	FRANKLIN	70092	0	70092	17667	220.79	0.605
7	HAMPDEN	456310	0	456310	115015	1437.38	3.938
8	HAMPSHIRE	146568	0	146568	36943	461.69	1.265
9	MIDDLESEX	1398468	0	1398468	352491	4405.17	12.069
10	NANTUCKET	6012	0	6012	1515	18.94	0.052
11	NORFOLK	616087	0	616087	155288	1940.67	5.317
12	PLYMOUTH	435276	0	435276	109713	1371.12	3.756
13	SUFFOLK	663906	0	663906	167341	2091.30	5.730
14	WORCESTER	709705	0	709705	178885	2235.57	6.125
	STATE	6016425	0	6016425	1516469	18951.74	51.923

ACTIVITY LEVEL UNITS : POPULATION
ACTIVITY LEVEL PROCESS : CODE 374
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PO THRUPUT : 25 %

WEEKS PER YEAR : 52
EMISSION FACTORS : VOC: 6.3 LB
EMISSION FACTOR UNITS : PERSON VOL.1 SEC.4.3.7, EPA SHORTLIST

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 0

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-26

AGRICULTURAL PESTICIDE USE VOC EMISSIONS 1990
ACREAGE GROWN FROM 1984/85 TO 1987/90

pestuma

CROP	LB/ACRE	GF 84/5 TO 87/90	1 BARNST ACRES	BARNST TONS PESTIC	2 BERK ACRES	BERK TONS PESTIC	3 BRIST ACRES	BRIST TONS PESTIC	4 DUKES ACRES	DUKES TONS PESTIC	5 ESSEX ACRES	ESSEX TONS PESTIC	6 FRANKL ACRES	FRANKL TONS PESTIC	7 HAMPD ACRES	HAMPD TONS PESTIC
CORN	1.9700	0.8622	0	0.0000	7353	6.2447	3706	3.1474	38	0.0323	1783	1.5142	6718	5.7054	3692	3.1355
FORAGE ETC	1.3733	1.0200	127	0.0889	34518	24.1758	9709	6.8000	2011	1.4085	11374	7.9662	27172	19.0308	12854	9.0027
SNAPBEAN	2.1845	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	11	0.0122	5	0.0055	8	0.0088
COLECROP ETC	2.6345	1.0125	2	0.0027	108	0.1440	516	0.6882	15	0.0200	469	0.6255	231	0.3081	602	0.8029
ROOTS-CARROT	1.7710	1.0125	0	0.0000	0	0.0000	11	0.0099	0	0.0000	0	0.0000	97	0.0870	21	0.0188
CUCUMBER	1.9487	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	321	0.3167	36	0.0355
EGGPLANT	1.9020	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	12	0.0116
LETTUCE	2.6037	1.0125	0	0.0000	0	0.0000	48	0.0633	0	0.0000	0	0.0000	4	0.0053	13	0.0171
ONION	2.6188	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	32	0.0424	5	0.0066
PEAS	0.7990	1.0125	0	0.0000	0	0.0000	0	0.0000	4	0.0016	0	0.0000	9	0.0036	0	0.0000
PEPPER	1.0144	1.0125	0	0.0000	0	0.0000	103	0.0529	0	0.0000	14	0.0072	75	0.0385	64	0.0329
POTATO	1.7334	1.0125	0	0.0000	146	0.1281	70	0.0614	0	0.0000	0	0.0000	939	0.8240	206	0.1808
SPINACH	1.3875	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
SQUASH	1.2764	1.0125	0	0.0000	0	0.0000	372	0.2404	0	0.0000	73	0.0472	247	0.1596	140	0.0905
SWEET CORN	1.2306	1.0125	18	0.0112	0	0.0000	0	0.0000	0	0.0000	0	0.0000	18	0.0112	172	0.1072
TOMATO	1.2109	1.0125	5	0.0031	0	0.0000	16	0.0098	0	0.0000	17	0.0104	31	0.0190	57	0.0349
BLUEBERRY	5.0565	1.0125	0	0.0000	7	0.0179	21	0.0538	0	0.0000	0	0.0000	0	0.0000	182	0.4659
RASPBERRY	3.7226	1.0125	0	0.0000	11	0.0207	0	0.0000	0	0.0000	21	0.0396	45	0.0848	12	0.0226
STRAWBERRY	1.9620	1.0125	14	0.0139	5	0.0050	33	0.0328	9	0.0089	82	0.0814	106	0.1053	34	0.0338
CRANBERRY	4.8400	1.0125	2350	5.7581	0	0.0000	1024	2.5091	31	0.0760	0	0.0000	0	0.0000	0	0.0000
GRAPE	1.8618	1.0125	2	0.0019	8	0.0075	118	0.1112	5	0.0047	11	0.0104	0	0.0000	0	0.0000
APPLE,ORCHRD	4.4509	1.0757	8	0.0192	526	1.2592	436	1.0437	6	0.0144	801	1.9175	921	2.2048	890	2.1306
NURSERY,GREENH	22.8605	1.0701	152	1.8592	364	4.4523	528	6.4582	9	0.1101	616	7.5346	180	2.2017	462	5.6510
GOLF COURSE	3.7697	1.0000	1952	3.6792	1596	3.0082	2306	4.3465	334	0.6295	2013	3.7942	350	0.6597	2645	4.9854
CHRISTMAS TREE	6.3469	1.0000	0	0.0000	127	0.4030	29	0.0920	2	0.0063	81	0.2570	38	0.1206	90	0.2856
FLOWERS	8.6176	1.0125	0	0.0000	18	0.0785	40	0.1745	9	0.0393	68	0.2967	0	0.0000	21	0.0916
TOBACCO	3.1500	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	93	0.1483	500	0.7973
TILLED LAND	2.0210	1.0125	1097	1.1224	4901	5.0145	3758	3.8450	611	0.6251	2197	2.2479	3952	4.0435	3255	3.3304
TOTAL ACREAGE (1984/85)			5727		49688		22844		3084		19631		41584		25973	
TOTAL PESTICIDE - TONS (1990)				12.5597		44.9595		29.7400		2.9767		26.3622		36.1258		31.2800
TOTAL SOLVENTS * 2.45 (1990)				30.7714		110.151		72.8631		7.2930		64.5873		88.5082		76.6360
1990 EMISS/SUMMER DAY			/214	0.1438		0.5147		0.3405		0.0341		0.3018		0.4136		0.3581

TABLE B.3-26 (CONT'D.)

AGRICULTURAL PESTICIDE USE VOC EMISSIONS 1990 (Cont'd)
ACREAGE GROWN FROM 1984/85 TO 1987/90

CROP	LB/ACRE	GF 84/5 TO 87/90	8 HAMPSH ACRES	HAMPSH TONS PESTIC	9 MIDSEX ACRES	MIDSEX TONS PESTIC	10 NANT ACRES	NANT TONS PESTIC	11 NORFLK ACRES	NORFLK TONS PESTIC	12 PLYMTH ACRES	PLYMTH TONS PESTIC	13 SUFFLK ACRES	SUFFLK TONS PESTIC	14 WORC ACRES	WORC TONS PESTIC	STATE
------	-------	------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	======
CORN	1.9700	0.8622	9736	8.2685	2350	1.9958	6	0.0051	602	0.5113	2015	1.7113	0	0.0000	8226	6.9861	
FORAGE ETC	1.3733	1.0200	24138	16.9058	13070	9.1540	235	0.1646	4756	3.3310	9792	6.8582	0	0.0000	43847	30.7097	
SNAPBEAN	2.1845	1.0125	30	0.0332	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	
COLECROP ET	2.6345	1.0125	437	0.5828	731	0.9749	0	0.0000	62	0.0827	222	0.2961	0	0.0000	399	0.5322	
ROOTS-CARRO	1.7710	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	6	0.0054	0	0.0000	0	0.0000	
CUCUMBER	1.9487	1.0125	331	0.3265	4	0.0039	0	0.0000	0	0.0000	2	0.0020	0	0.0000	0	0.0000	
EGGPLANT	1.9020	1.0125	5	0.0048	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	
LETTUCE	2.6037	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	
ONION	2.6188	1.0125	81	0.1074	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	
PEAS	0.7990	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	15	0.0061	0	0.0000	1	0.0004	
PEPPER	1.0144	1.0125	62	0.0318	0	0.0000	0	0.0000	0	0.0000	8	0.0041	0	0.0000	0	0.0000	
POTATO	1.7334	1.0125	1554	1.3637	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	33	0.0290	
SPINACH	1.3875	1.0125	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	
SQUASH	1.2764	1.0125	533	0.3444	249	0.1609	0	0.0000	3	0.0019	13	0.0084	0	0.0000	193	0.1247	
SWEET CORN	1.2306	1.0125	27	0.0168	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	104	0.0648	
TOMATO	1.2109	1.0125	155	0.0950	8	0.0049	24	0.0147	0	0.0000	64	0.0392	0	0.0000	86	0.0527	
BLUEBERRY	5.0565	1.0125	28	0.0717	3	0.0077	0	0.0000	8	0.0205	64	0.1638	0	0.0000	102	0.2611	
RASPBERRY	3.7226	1.0125	28	0.0528	0	0.0000	0	0.0000	0	0.0000	3	0.0057	0	0.0000	8	0.0151	
STRAWBERRY	1.9620	1.0125	69	0.0685	0	0.0000	0	0.0000	4	0.0040	18	0.0179	0	0.0000	38	0.0377	
CRANBERRY	4.8400	1.0125	0	0.0000	137	0.3357	314	0.7694	62	0.1519	11281	27.6413	0	0.0000	0	0.0000	
GRAPE	1.8618	1.0125	0	0.0000	3	0.0028	18	0.0170	0	0.0000	6	0.0057	0	0.0000	5	0.0047	
APPLE,ORCHR	4.4509	1.0757	802	1.9199	1508	3.6100	0	0.0000	175	0.4189	105	0.2514	0	0.0000	4016	9.6140	
NURSERY,GRE	22.8605	1.0701	323	3.9508	1109	13.5647	9	0.1101	161	1.9693	462	5.6510	19	0.2324	376	4.5990	
GOLF COURSE	3.7697	1.0000	867	1.6342	3298	6.2162	246	0.4637	1997	3.7640	2091	3.9412	196	0.3694	3128	5.8958	
CHRISTMAS T	6.3469	1.0000	59	0.1872	140	0.4443	0	0.0000	0	0.0000	29	0.0920	0	0.0000	137	0.4348	
FLOWERS	8.6176	1.0125	58	0.2530	18	0.0785	0	0.0000	30	0.1309	11	0.0480	0	0.0000	58	0.2530	
TOBACCO	3.1500	1.0125	138	0.2201	5055	8.0611	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000	
TILLED LAND	2.0210	1.0125	3853	3.9422	0	0.0000	174	0.1780	1881	1.9245	3214	3.2884	40	0.0409	6072	6.2126	
TOTAL ACREAGE (1984/85)			43314		27683		1026		9741		29421		255		66829		346800
TOTAL PESTICIDE - T (1990)				40.3812		44.6156		1.7225		12.3110		50.0369		0.6428		65.8273	399.541
TOTAL SOLVENTS * 2.45 (1990)				98.9340		109.308		4.2202		30.1619		122.590		1.5748		161.277	978.876
1990 EMISS/SUMMER DAY				0.4623		0.5108		0.0197		0.1409		0.5729		0.0074		0.7536	4.5742

TABLE B.3-27

pestagr3

AGRICULTURAL AND NON-AGRICULTURAL PESTICIDE VOC EMISSIONS 1990

33 SCC : 24-61-800-000 AGRICULTURAL & NON AGRICULT COMBINED

STATE ACTIVITY LEVEL : 1,285.6 TONS PESTICIDE

COUNTY ACTIVITY LEVEL :

	COUNTIES	S.F.HOUS	NON-AG PEST TONS	AGRIC PEST TONS	TONS ANNUAL ACTIVIT *2.45	OZ PO ACTIV /214*92	VOC TPY EM.FAC 2000 LB	VOC PO TPSD /92
1	BARNSTABLE	8.2	10.3	12.56	55.9	24	55.93	0.261
2	BERKSHIRE	3.1	3.9	44.96	119.7	51	119.66	0.559
3	BRISTOL	7.5	9.4	29.74	95.9	41	95.87	0.448
4	DUKES	0.8	1.0	2.98	9.8	4	9.76	0.046
5	ESSEX	11.0	13.8	26.36	98.3	42	98.33	0.459
6	FRANKLIN	1.4	1.8	36.13	92.8	40	92.81	0.434
7	HAMPDEN	7.8	9.8	31.28	100.6	43	100.57	0.470
8	HAMPSHIRE	2.5	3.1	40.38	106.6	46	106.60	0.498
9	MIDDLESEX	21.8	27.3	44.62	176.2	76	176.20	0.823
10	NANTUCKET	0.4	0.5	1.72	5.4	2	5.44	0.025
11	NORFOLK	11.1	13.9	12.31	64.2	28	64.21	0.300
12	PLYMOUTH	9.3	11.6	50.04	151.1	65	151.13	0.706
13	SUFFOLK	3.8	4.8	0.64	13.2	6	13.23	0.062
14	WORCESTER	11.3	14.1	65.83	196.0	84	195.95	0.916
	STATE	100.0	125.2	399.55	1285.7	553	1285.69	6.008

ACTIVITY LEVEL UNITS : TONS PESTICIDE
ACTIVITY LEVEL PROCESS :
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PO THRUPUT : 43 %
WEEKS PER YEAR : 52
EMISSION FACTORS : VOC: 2000 LB
EMISSION FACTOR UNITS : LB/ TON VOL.1 SEC.4.3.6

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-28

3bakery1

BAKERY VOC EMISSIONS 1990

34 SCC : 23-02-050-000

STATE ACTIVITY LEVEL TONS

	COUNTY ACTIVITY LEVE ------ COUNTIE	EMPL 1990	SSEIS EMISS	ANNUAL ACTIV - POINT	.15194 ANNUAL ACTIVITY TONS	OZ PO ACTIV /365*9	PERIOD ***** OZ PO ACTIV TONS	VOC TPY EM.FAC 2000LB/T	VOC PO TPSD /92
1	BARNSTA	498	0	498	75.7	126	19.1	75.67	0.207
2	BERKSHI	372	0	372	56.5	94	14.2	56.52	0.155
3	BRISTOL	1353	157	320	48.6	81	12.2	48.58	0.133
4	DUKES	31	0	31	4.7	8	1.2	4.71	0.013
5	ESSEX	1789	0	1789	271.8	451	68.5	271.82	0.745
6	FRANKLI	187	0	187	28.4	47	7.2	28.41	0.078
7	HAMPDEN	1219	0	1219	185.2	307	46.7	185.21	0.507
8	HAMPSHI	391	0	391	59.4	99	15.0	59.41	0.163
9	MIDDLES	3735	0	3735	567.5	941	143.0	567.50	1.555
10	NANTUCK	16	0	16	2.4	4	0.6	2.43	0.007
11	NORFOLK	1645	0	1645	249.9	415	63.0	249.94	0.685
12	PLYMOUT	1162	0	1162	176.6	293	44.5	176.55	0.484
13	SUFFOLK	1773	0	1773	269.4	447	67.9	269.39	0.738
14	WORCEST	1896	94	1277	194.1	322	48.9	194.08	0.532
	STATE	16067	251	14415	2190.2	3633	552.1	2190.22	6.001

ACTIVITY LEVEL UNITS : TONS OF DOUGH
ACTIVITY LEVEL PROCESS :
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PO THRUPUT : 25.2%

WEEKS PER YEAR : 52
EMISSION FACTORS :VOC: 2000 LB VOC (0.15194 TON VOC /EMPLOYEE)
EMISSION FACTOR UNITS : TON OF DOUGH

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-29

CATASTROPHIC/ACCIDENTAL SPILLS 1990

spilsolv

SOLVENT SPILLS

COUNTI	DENS LB/GL 9.2 HERBC	TONS VOC	DENS LB/GL 7 MINER SPIRIT	TONS VOC	DENS LB/GL 6.6 PAINT SPILLS	TONS VOC	DENS LB/GL 11.2 PERC	TONS VOC	DENS LB/GL 8.3 SOLVEN	TONS VOC	DENS LB/GL 8.3 STYREN	TONS VOC	DENS LB/GL 7.3 TOLUEN	TONS VOC	DENS LB/GL 12.3 TRIETL	TONS VOC	SOLVENT SPILLS TOTAL 100% VOC TPY	SOLVENT SPILLS TOTAL VOC TPSD
BARNST	0		0		0		0		1	0.004	0		0		0		0.00	0.000
BERKSH	0		0		0		0		2.4	0.009	0		260	0.949	0		0.96	0.003
BRISTO	0		0		0		0		45	0.186	0		100	0.365	0		0.55	0.002
DUKES	0		0		0		0		0		0		0		0		0.00	0.000
ESSEX	10	0.046	5000	17.5	0		10	0.056	27	0.112	0		0		0		17.71	0.049
FRANKL	0		0		0		0		0		0		0		0		0.00	0.000
HAMPDE	0		0		0		0		2	0.008	10	0.041	510	1.861	0		1.91	0.005
HAMPSH	0		0		250	0.825	100	0.56	0		210	0.871	0		10	0.061	2.32	0.006
MIDDLE	0		0		100	0.33	0		314	1.303	0		0		1	0.006	1.64	0.004
NANTUC	0		0		0		0		0		0		0		0		0.00	0.000
NORFOL	0		0		0		0		670	2.780	0		0		0		2.78	0.008
PLYMOU	0		100	0.35	0		10	0.056	10	0.041	0		0		0		0.45	0.001
SUFFOL	0		0		20	0.066	10	0.056	60	0.249	0		0		10	0.061	0.43	0.001
WORCES	0		11	0.038	0		100	0.56	20	0.083	0		0		250	1.537	2.22	0.006
STATE	10	0.046	5111	17.88	370	1.221	230	1.288	1151.4	4.778	220	0.913	870	3.175	271	1.666	30.98	0.085

TABLE B.3-30

CATASTROPHIC/ACCIDENTAL SPILLS 1990

spilsolv

PETROLEUM SPILLS

	DENS		DENS		DENS		DENS		DENS		DENS		DENS	DENS		DENS		DENS			PETRO	TOTAL	TOTAL
	LB/GL		LB/GL		LB/GL		LB/GL		LB/GL		LB/GL		LB/GL	LB/GL		LB/GL		LB/GL			SPILL	SOLVENT	SOLVENT
	7.1	/2000	7.5	/2000	7.9	/2000	6.725	/2000	6.4	/2000	7	/2000	5.6	5.6	/2000	7	/2000	6.54	/2000	TOTAL	VOC	& PETRO	& PETRO
	FUEL	TOTAL	FUEL	TOTAL	FUEL	TOTAL		TOTAL	AVIAT	TOTAL	JET	TOTAL			TOTAL		TOTAL	MISC	TOTAL	PETRO	/365	SPILLS	SPILLS
CNTY	OIL #2	TONS	OIL #4	TONS	OIL #6	TONS	ASPHALT	TONS	GASOL	TONS	FUEL	TONS	DIESEL	GASOL	TONS	KEROSEN	TONS	OIL	TONS	TONS	TPSD	VOC TPY	TPSD
BARNS	1990	7.06	10	0.04	0	0.00	0	0.00	250	0.80	10	0.035	400	130	1.48	0	0.00	0	0.00	9.42	0.026	9.43	0.026
BERKS	610	2.17	0	0.00	1010	3.99	0	0.00	0	0.00	0	0	1180	121	3.64	0	0.00	5010	16.38	26.18	0.072	27.14	0.074
BRIST	15130	53.71	0	0.00	2	0.01	0	0.00	0	0.00	0	0	551	660	3.39	10	0.04	100	0.33	57.47	0.157	58.02	0.159
DUKES	1000	3.55	0	0.00	0	0.00	0	0.00	0	0.00	0	0	250	0	0.70	0	0.00	0	0.00	4.25	0.012	4.25	0.012
ESSEX	13902	49.35	130	0.49	5000	19.75	10	0.03	0	0.00	260	0.91	6080	1370	20.86	260	0.91	290	0.95	93.25	0.255	110.97	0.304
FRANK	7210	25.60	10	0.04	0	0.00	0	0.00	0	0.00	0	0	1380	20	3.92	0	0.00	0	0.00	29.55	0.081	29.55	0.081
HAMPD	1370	4.86	0	0.00	1	0.00	0	0.00	0	0.00	0	0	0	3	0.01	0	0.00	0	0.00	4.88	0.013	6.79	0.019
HAMPS	11836	42.02	31	0.12	21	0.08	0	0.00	0	0.00	0	0	1241	10220	32.09	10	0.04	120	0.39	74.74	0.205	77.05	0.211
MIDDL	18866	66.97	10100	37.88	5110	20.18	0	0.00	10	0.03	0	0	3890	701	12.85	260	0.91	352	1.15	139.98	0.384	141.62	0.388
NANTU	5250	18.64	0	0.00	0	0.00	0	0.00	0	0.00	0	0	10010	0	28.03	0	0.00	0	0.00	46.67	0.128	46.67	0.128
NORFO	9281	32.95	260	0.98	110	0.43	0	0.00	0	0.00	0	0	3251	760	11.23	0	0.00	21	0.07	45.66	0.125	48.44	0.133
PLYMO	1830	6.50	110	0.41	0	0.00	0	0.00	0	0.00	0	0	10	61	0.20	250	0.88	0	0.00	7.98	0.022	8.43	0.023
SUFFO	9821	34.86	15450	57.94	11010	43.49	0	0.00	10	0.03	1280	4.48	6960	1060	22.46	5000	17.50	15290	50.00	230.76	0.632	231.19	0.633
WORCE	22312	79.21	450	1.69	350	1.38	0	0.00	0	0.00	0	0	8510	7040	43.54	1	0.00	520	1.70	127.52	0.349	129.74	0.355
STATE	120408	427.4	26551	99.57	22614	89.33	10	0.03	270	0.86	1550	5.425	43713	22146	184.4	5791	20.27	21703	70.97	898.31	2.461	929.28	2.546

TABLE B.3-31

spillams

CATASTROPHIC /ACCIDENT SPILLS VOC EMISSIONS 1990

35 SCC : 28-30-000-000 PETROLEUM & SOLVENT SPILLS COMBINED

STATE ACTIVITY LEVEL : TONS SPILLED

	COUNTY ACTIVITY LEVEL : COUNTIES	POP 1990	% POP	ANNUAL ACTIVITY TONS	OZ PO ACTIV /365*92	VOC TPY EM.FAC 2000LB/TN	VOC PO TPSD /92
1	BARNSTABLE			9.4	2.4	9.40	0.026
2	BERKSHIRE			27.1	6.8	27.10	0.074
3	BRISTOL			58.0	14.6	58.00	0.159
4	DUKES			4.3	1.1	4.30	0.012
5	ESSEX			111.0	28.0	111.00	0.304
6	FRANKLIN			29.6	7.5	29.60	0.081
7	HAMPDEN			6.8	1.7	6.80	0.019
8	HAMPSHIRE			77.1	19.4	77.10	0.211
9	MIDDLESEX			141.6	35.7	141.60	0.388
10	NANTUCKET			46.7	11.8	46.70	0.128
11	NORFOLK			48.4	12.2	48.40	0.133
12	PLYMOUTH			8.4	2.1	8.40	0.023
13	SUFFOLK			231.2	58.3	231.20	0.633
14	WORCESTER			129.7	32.7	129.70	0.355
	STATE			929.3	234.2	929.30	2.546

ACTIVITY LEVEL UNITS : TONS SPILLED

ACTIVITY LEVEL PROCESS :

ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7

PO THRUPUT : 25.2 %

WEEKS PER YEAR : 52

EMISSION FACTORS : VOC: 2000 LB VOC

EMISSION FACTOR UNITS : TON (USE OF DENSITIES OF SPILLED CHEMICALS)

RULE EFFECTIVENESS : N/A

RULE PENETRATION : N/A

SIP RULE : NO

PO INTERVAL : 1 HR

WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

TABLE B.3-32

asphroof

ASPHALT ROOFING & TANKERS VOC EMISSIONS 1990

36 SCC : 24-61-023-000

STATE ACTIVITY LEVEL : EMPLOYMENT

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	% POP	ANNUAL ACTIVITY 863 EMP	OZ PO ACTIV /312*78 *1.4	VOC TPY EM.FAC .0387 TON/EM	VOC PO TPSD /78*1.4
1	BARNSTABLE	186605	3.1%	27	9	1.04	0.005
2	BERKSHIRE	139352	2.3%	20	7	0.77	0.003
3	BRISTOL	506325	8.4%	73	25	2.81	0.013
4	DUKES	11639	0.2%	2	1	0.06	0.000
5	ESSEX	670080	11.1%	96	34	3.72	0.017
6	FRANKLIN	70092	1.2%	10	4	0.39	0.002
7	HAMPDEN	456310	7.6%	65	23	2.53	0.011
8	HAMPSHIRE	146568	2.4%	21	7	0.81	0.004
9	MIDDLESEX	1398468	23.2%	201	70	7.76	0.035
10	NANTUCKET	6012	0.1%	1	0	0.03	0.000
11	NORFOLK	616087	10.2%	88	31	3.42	0.015
12	PLYMOUTH	435276	7.2%	62	22	2.42	0.011
13	SUFFOLK	663906	11.0%	95	33	3.69	0.017
14	WORCESTER	709705	11.8%	102	36	3.94	0.018
	STATE	6016425	100.0%	863	302	33.40	0.150

ACTIVITY LEVEL UNITS : EMPLOYMENT
ACTIVITY LEVEL PROCESS :
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PO THRUPUT : 35 %
WEEKS PER YEAR : 52
EMISSION FACTORS : VOC: 0.0387 TON
EMISSION FACTOR UNITS : EMPLOYEE VOL.1 DEC.1988 VERSION (SCALE UP METHODOLOGY)
RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

lust90

Table B.3-33

LEAKING UNDERGROUND STORAGE TANKS VOC EMISSIONS 1990

	COUNTIES	#2 FUEL	#4 FUEL	#6 FUEL	DIESEL	GASOLINE	JET FUEL	MISC	MAY-SEPT TOTAL	MAY-SEPT TONS VOC	VOC TPSD /153
1	BARNSTABLE	35	1	0	1	8	0	0	45	0.6300	0.0041
2	BERKSHIRE	3	1	0	0	6	0	0	10	0.1400	0.0009
3	BRISTOL	7	0	1	0	12	0	0	20	0.2800	0.0018
4	DUKES	0	0	0	0	2	0	0	2	0.0280	0.0002
5	ESSEX	11	3	2	3	25	4	3	51	0.7140	0.0047
6	FRANKLIN	0	0	0	0	4	0	0	4	0.0560	0.0004
7	HAMPDEN	9	1	3	0	19	0	1	33	0.4620	0.0030
8	HAMPSHIRE	6	0	1	0	3	0	0	10	0.1400	0.0009
9	MIDDLESEX	30	1	4	6	50	1	3	95	1.3300	0.0087
10	NANTUCKET	0	0	0	0	0	0	0	0	0.0000	0.0000
11	NORFOLK	6	2	4	1	17	0	2	32	0.4480	0.0029
12	PLYMOUTH	7	1	1	3	17	0	0	29	0.4060	0.0027
13	SUFFOLK	9	0	1	4	24	2	0	40	0.5600	0.0037
14	WORCESTER	13	2	0	3	24	0	1	43	0.6020	0.0039
									414	5.7960	0.0379
	STATE	136	12	17	21	211	7	10	414	5.7960	0.0379

TABLE B.3-34

lustams5

LEAKING UNDERGROUND STORAGE TANKS VOC EMISSIONS 1990

nov 22 93

65 SCC : 26-60-000-000

STATEWIDE ACTIVITY 414 LUST SITES - CHANGED TO TONS FOR AMS

	COUNTY ACTIVITY LEVEL : COUNTIES	ACTIVITY #SITES (TONS)	OZ PO ACTIV 92/153	VOC TPY EM.FAC 28 lb/ton	VOC PO TPSD /92	VOC PO LBSD
1	BARNSTABLE	45	27	0.63	0.004	8.24
2	BERKSHIRE	10	6	0.14	0.001	1.83
3	BRISTOL	20	12	0.28	0.002	3.66
4	DUKES	2	1	0.03	0.000	0.37
5	ESSEX	51	31	0.71	0.005	9.33
6	FRANKLIN	4	2	0.06	0.000	0.73
7	HAMPDEN	33	20	0.46	0.003	6.04
8	HAMPSHIRE	10	6	0.14	0.001	1.83
9	MIDDLESEX	95	57	1.33	0.009	17.39
10	NANTUCKET	0	0	0.00	0.000	0.00
11	NORFOLK	32	19	0.45	0.003	5.86
12	PLYMOUTH	29	17	0.41	0.003	5.31
13	SUFFOLK	40	24	0.56	0.004	7.32
14	WORCESTER	43	26	0.60	0.004	7.87
	STATE	414	249	5.80	0.038	75.76

ACTIVITY LEVEL UNITS : SITES (TONS LEAKED)
ACTIVITY LEVEL PROCESS : N/A
ACTIVITY LEVEL METHOD : CODE 204

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 60.1 %

EMISSION FACTORS : VOC: 28 LB RADIAN MEMO -GROH TO LARSON 5/6/92
EMISSION FACTOR UNITS :510 LB/TON 28 LB VOC/DAY PER SITE
SITE" CHANGED TO "TONS" FOR AMS

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS:

TABLE B.3-35

5chem90

SYNTHETIC CHEMICAL MANUFACTURING AND STORAGE TANK VOC EMISSIONS 1990 TPY AND TPSD

sep14 93

COUNTIES	CPB EMPLOY	SCALE UP EF.26197 VOC TONS	SSEIS >10 TPY	NET AREA VOC TPY	NET AREA VOC/365 TPSD
BARNSTABLE	10	2.62	0	2.62	0.007
BERKSHIRE	249	65.23	0	65.23	0.179
BRISTOL	869	227.65	26	201.65	0.552
DUKES	0	0.00	0	0.00	0.000
ESSEX	2245	588.12	320	268.12	0.735
FRANKLIN	10	2.62	0	2.62	0.007
HAMPDEN	914	239.44	239.44	0.00	0.000
HAMPSHIRE	189	49.51	16	33.51	0.092
MIDDLESEX	4339	1136.69	152	984.69	2.698
NANTUCKET	0	0.00	0	0.00	0.000
NORFOLK	1351	353.92	65	288.92	0.792
PLYMOUTH	271	70.99	0	70.99	0.195
SUFFOLK	684	179.19	0	179.19	0.491
WORCESTER	1550	406.05	98	308.05	0.844
STATE	12681	3322.04	916.44	2405.60	6.591
	12681	3322.04	916.44	2405.60	6.591

TABLE B.3-36

5chemAMS

SYNTHETIC CHEMICAL MANUFACTURE AND STORAGE TANKS
VOC EMISSIONS 1990

66 SCC : 25-10-000-000

STATE ACTIVITY LEVEL : GALLONS STORED

NB EMISSIONS FROM TABLE B.3- USED AS SURROGATE FOR EMPLOYMENT

EMISSIONS WAS ESTIMATED BY SCALE-UP - SIC 28

	COUNTY ACTIVITY LEVEL : COUNTIES		ANNUAL ACTIVITY GALLONS	OZ PO ACTIV /365*92	VOC TPY EM.FAC 2LB/GAL	VOC PO TPSD /365	LB/DY
1	BARNSTABLE	2.6	2620	660	2.62	0.007	14
2	BERKSHIRE	65.2	65230	16442	65.23	0.179	357
3	BRISTOL	201.7	201650	50827	201.65	0.552	1105
4	DUKES	0.0	0	0	0.00	0.000	0
5	ESSEX	268.1	268120	67581	268.12	0.735	1469
6	FRANKLIN	2.6	2620	660	2.62	0.007	14
7	HAMPDEN	0.0	0	0	0.00	0.000	0
8	HAMPSHIRE	33.5	33510	8446	33.51	0.092	184
9	MIDDLESEX	984.7	984690	248196	984.69	2.698	5396
10	NANTUCKET	0.0	0	0	0.00	0.000	0
11	NORFOLK	288.9	288920	72824	288.92	0.792	1583
12	PLYMOUTH	71.0	70990	17893	70.99	0.194	389
13	SUFFOLK	179.2	179190	45166	179.19	0.491	982
14	WORCESTER	308.1	308050	77645	308.05	0.844	1688
	STATE	2405.6	2405590	606340	2405.59	6.591 13181	

ACTIVITY LEVEL UNITS : GALLONS STORED code 251

ACTIVITY LEVEL PROCESS : 07

ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7

PO THRUPUT : 25.2 %

WEEKS PER YEAR : 52

EMISSION FACTORS : VOC: 2 LB VOC PER GALLONS

EMISSION FACTOR UNITS : GALLON (code 515 ie lb VOC per gal)

RULE EFFECTIVENESS : N/A

RULE PENETRATION : N/A

SIP RULE : NO

PO INTERVAL : 1 HR

WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: SUMMER JUNE-AUGUST (TABLE C.4 MOBILE SECTION)

* Hampden in scale-up -Point emissions higher than Area

TABLE B.3-37

solvtot3
revised nov 2 93

TOTAL SOLVENT EVAPORATION 1990 TPY AND TPSD ALL CATEGORIES

												(T.B.3-8) INDUSTRIAL				CUTBACK		EMULSIFIED	
	DRY CLEAN		DEGREASING		ARCHITECT COAT		AUTO REFINISH		TRAFFIC MARK		SURFACE COAT		GRAPHIC ARTS		ASPHALT PAVI		ASPHALT PAVIN	
		/52*6		/52*6		/365*1.4		/52*5		/312		/52*5				/365		/365
COUNTIES	TPY	TPSD	TPY	TPSD	TPY	TPSD	TPY	TPSD	TPY	TPSD	TPY	TPSD	TPY	TPSD	TPY	TPSD	TPY	TPSD
BARNSTABL	207.74	0.666	85.83	0.275	429.19	1.646	214.60	0.825	46.65	0.179	383.60	1.475	121.29	0.467	4.86	0.013	0.37	0.001
BERKSHIRE	139.23	0.446	338.00	1.083	320.51	1.229	160.25	0.616	34.84	0.134	782.69	3.010	90.58	0.348	3.63	0.010	0.28	0.001
BRISTOL	489.52	1.569	1036.69	3.323	1164.55	4.467	582.27	2.240	126.58	0.487	1678.55	6.456	279.11	1.074	13.19	0.036	1.01	0.003
DUKES	22.10	0.071	0.00	0.000	26.77	0.103	13.38	0.051	2.91	0.011	20.37	0.078	7.57	0.029	0.30	0.001	0.02	0.000
ESSEX	668.53	2.143	805.19	2.581	1541.18	5.911	770.59	2.964	167.52	0.644	4917.28	18.913	375.55	1.444	17.46	0.048	1.34	0.004
FRANKLIN	132.60	0.425	101.88	0.327	161.21	0.618	80.61	0.310	17.52	0.067	442.08	1.700	45.56	0.175	1.83	0.005	0.14	0.000
HAMPDEN	467.42	1.498	687.47	2.203	1049.51	4.026	524.76	2.018	114.08	0.439	1786.95	6.873	255.60	0.983	11.89	0.033	0.91	0.002
HAMPSHIRE	276.25	0.885	214.24	0.687	337.11	1.293	168.55	0.648	36.64	0.141	463.47	1.783	95.27	0.366	3.82	0.010	0.29	0.001
MIDDLESEX	1769.11	5.670	4653.85	14.916	3216.48	12.337	1608.24	6.186	349.62	1.345	8835.21	33.982	558.00	2.146	36.44	0.100	2.80	0.008
NANTUCKET	11.05	0.035	0.00	0.000	13.83	0.053	6.91	0.027	1.50	0.006	10.52	0.040	3.91	0.015	0.16	0.000	0.01	0.000
NORFOLK	1088.43	3.489	1272.07	4.077	1417.00	5.435	708.50	2.725	154.02	0.592	2064.30	7.940	315.46	1.213	16.05	0.044	1.23	0.003
PLYMOUTH	382.33	1.225	458.14	1.468	1001.13	3.840	500.57	1.925	108.82	0.419	1395.46	5.367	169.93	0.654	11.34	0.031	0.87	0.002
SUFFOLK	682.89	2.189	560.54	1.797	1526.98	5.857	763.49	2.937	165.98	0.638	1852.26	7.124	328.54	1.264	17.30	0.047	1.33	0.004
WORCESTER	564.66	1.810	1616.20	5.180	1632.32	6.261	816.16	3.139	177.43	0.682	4158.85	15.996	443.31	1.705	18.49	0.051	1.42	0.004
STATE	6901.86	22.12	11830.10	37.917	13837.77	53.076	6918.88	26.611	1504.11	5.785	28791.59	110.737	3089.68	11.883	156.76	0.429	12.02	0.033

TABLE B.3-37 (Cont'd)

solvtot3 TOTAL SOLVENT EVAPORATION 1990 TPY AND TPSD ALL CATEGORIES

G COUNTIES	COMM/CONS SOLV TPY	/365 TPSD	PESTICIDES TPY	/214*92 TPSD	BAKERY TPY	TPSD	SPILLS PETROL TPY	/365 TPSD	ASPHALT ROOF TPY	ASPHALT ROOF/214 TPSD	LUST TPY	LUST TPSD	CHEM STORAGE TANKS TPY	CHEM STORAG TANKS TPSD	TOTAL SOLVENT EMISSIONS TPY	TOTAL SOLVENT EMISSIONS TPSD
=========	======	======	=======	======	=======	======	======	======	=======	=======	=======	======	=======	=======	==========	========
BARNSTABL	587.81	1.610	55.93	0.261	75.67	0.207	9.43	0.026	1.04	0.005	0.63	0.004	2.62	0.007	2227.26	7.669
BERKSHIRE	438.96	1.203	119.66	0.559	56.52	0.155	27.14	0.074	0.77	0.003	0.14	0.001	65.23	0.179	2578.43	9.052
BRISTOL	1594.92	4.370	95.87	0.448	48.57	0.133	58.02	0.159	2.81	0.013	0.28	0.002	201.65	0.552	7373.59	25.330
DUKES	36.66	0.100	9.76	0.046	4.71	0.013	4.25	0.012	0.06	0.000	0.03	0.000	0.00	0.000	148.89	0.515
ESSEX	2110.75	5.783	98.33	0.459	271.82	0.745	110.97	0.304	3.72	0.017	0.71	0.005	268.12	0.735	12129.06	42.700
FRANKLIN	220.79	0.605	92.81	0.434	28.41	0.078	29.55	0.081	0.39	0.002	0.06	0.000	2.62	0.007	1358.06	4.835
HAMPDEN	1437.38	3.938	100.57	0.470	185.21	0.507	6.79	0.019	2.53	0.011	0.46	0.003	0.00	0.000	6631.53	23.023
HAMPSHIRE	461.69	1.265	106.60	0.498	59.41	0.163	77.05	0.211	0.81	0.004	0.14	0.001	33.51	0.092	2334.85	8.048
MIDDLESEX	4405.17	12.069	176.20	0.823	567.50	1.555	141.62	0.388	7.76	0.035	1.33	0.009	984.69	2.698	27314.02	94.266
NANTUCKET	18.94	0.052	5.44	0.025	2.43	0.007	46.67	0.128	0.03	0.000	0.00	0.000	0.00	0.000	121.4	0.389
NORFOLK	1940.67	5.317	64.21	0.300	249.94	0.685	48.44	0.133	3.42	0.015	0.45	0.003	288.92	0.792	9633.11	32.762
PLYMOUTH	1371.12	3.756	151.13	0.706	176.55	0.484	8.43	0.023	2.42	0.011	0.41	0.003	70.99	0.194	5809.64	20.110
SUFFOLK	2091.30	5.730	13.23	0.062	269.39	0.738	231.19	0.633	3.69	0.017	0.56	0.004	179.19	0.491	8687.86	29.531
WORCESTER	2235.57	6.125	195.95	0.916	194.08	0.532	129.74	0.355	3.94	0.018	0.60	0.004	308.05	0.844	12496.77	43.622
															98844.47	341.853
STATE	18951.73	51.923	1285.69	6.008	2190.21	6.001	929.29	2.546	33.390	0.153	5.80	0.039	2405.59	6.591	98844.47	341.853

REFERENCES FOR SOLVENT EVAPORATION

1. "Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone," Volume 1: General Guidance for Stationary Sources. EPA OAQPS RTP, NC 450/4-91-016 May 1991.

2. "Stationary Source Enforcement Inventory System (SSEIS)." DEP Division of Air Quality Control 1990 Emissions Data.

3. "County Business Patterns 1989 - Massachusetts" CPB 89-23 U.S. Department of Commerce, Bureau of Census, June 1991.

4. "1990 Census of Population and Housing." Summary Population and Housing Characteristics - Massachusetts, U.S. Department of Commerce, Bureau of Census, August 1991.

5. "Compilation of Air Pollutant Emission Factors" AP-42, Vol. 1 Stationary, Point and Area Sources, EPA, OAQP RTP NC 4th ed. September 1985, Supplements A-D, September 1991.

6. Telephone Survey to paint distributors and contractors.
   California Paints - David Lohr - N. East Regional Sales Director - 547-5300 X 228
   Sherwin Williams Distributor - Neeham 444-4698
   Benjamin Moore-Contractor - Milford 473-8900
   W. T. Kenney, Contractor-Arlington 643-2105
   Ahern Contractor-Chrishundgren-Melrose 665-5600

7. Massachusetts Department of Public Works, Maintenance Division, Mr. Steve Quinlan. Telephone Interview April 1, 1992.

8. Massachusetts Air Pollution Control Regulations 310 CMR 7.02-7.18.

9. Asphalt Institute of America, College Park, MD Telephone Interview with Mr. Ross Bentsen, March 31st 1992.

10. Massachusetts Department of Food and Agriculture - List of banned Chemicals in the State, Farm Bureau - Mr. Jay Flattery 617-275-4374.

11. University of Massachusetts, The Environmental Institute, Plant and Soil Sciences Dept., Amherst,MA, and DEP Office of Research and Standards. Allen V. Barker and Jo-Ann C. Dery’ "Assessment of Agricultural Activities on Cropland in Massachusetts." June 1986.

12. Census of Agriculture, U.S. Department of Food and Agriculture, Washington, D.C. 1987.

13. Massachusetts Department of Food and Agriculture, "A Generic Environmental Impact Report on the Control of Vegetation on Utility and Railroad Rights-of-Way in the Commonwealth of Massachusetts" - Report prepared by Harrison Biotech, Inc. January 1985.

14. National Lawn Care Association. Telephone Interview with Dr. Wilkinson, July 1986.

15. Massachusetts Department of Food and Agriculture "Integrated Pest Management Program in Massachusetts". July 1987.

16. Massachusetts Institute for Social and Economic Research (MISER) University of Massachusetts, Amherst. 1990 and 1995 Population Projections.

17. DEP Division of Waste Site Clean-up, Stephanie McCleod, Listing of Hazardous Spills in Massachusetts, Amherst. 1990 and 1995 Population Projections.

18. U.S. Department of Transportation, National Response Center, U.S. Coast Guard, Office of Commandant, D. W. Neach, "Chemical Releases for the State of Massachusetts 1990," Washington, DC.

19. EPA Aerometric Information Retrieval System (AIRS) AMS Shortlist of SCC's and Emission Factors. July 1992.

20. EPA Comments on 1990 Draft Emission Inventories September 1 1992.

21. Directory of Massachusetts Manufacturers 1991-1992, George D. Halls, Associated Industries of Massachusetts, Boston, MA 1992.

22. Radian Corporation, Memorandum to SIP Inventory Preparers from Glen Rives and Lauren Ellmore.

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B.4 SMALL STATIONARY FUEL COMBUSTION AND FIRES

This category includes small boilers, furnaces, heaters and other heating units too small to be inventoried as point sources. The methodology for estimating VOC, NOx and CO emissions is to obtain the type and amount of fuel used in the following three categories: residential, commercial/institutional and industrial. Collectively, these three categories account for the stationary fuel combusiton not inventoried as stationary point sources.

VOC, NOx and CO emissions are estimated by multiplying the quantity and type of fuel used by the appropriate emission factors.

Total fuel use for Massachusetts was obtained from the Department of Energy's latest annual report "State Energy Data Report -Consumption Estimates 1960-1990".[4] This is a very comprehensive report in that it provides data on the quantity of fuel used by type of fuel and broken down by categories of consumption in Tables 145 to 148. These categories include residential, commercial, industrial, transportation, and electric utilities. Emissions from fuel use in the residential setting is inventoried in this area source category. For the commercial and industrial fuel uses, the quantity of fuel obtained from SSEIS for point sources above 10 tons of VOC, 50 tons NOx and 100 tons CO, was subtracted from the total in order to avoid double counting fuel usage.

The availability of this comprehensive Department of Energy's fuel use report, therefore, eliminates the use of the complex equations provided in Volume 1 Section 4.7-1 to estimate fuel usage by residential/commercial or industrial use. VOC emissions were then calculated by multiplying the fuel usage by the appropriate emission factors provided in AP-42[5] and cross-checked with NAPAP emission factors.[6] The following are the fuels from which VOC, NOx and CO emissions are calculated: bituminous and anthracite coal, distillate and residential oil, natural gas, woodburning, kerosene, and liquid petroleum gas. Seasonal adjustment is based on Vol. 1 T.5.8-1. A factor of 0.3 is given for residential fuel use for the ozone season, but cannot be used for coal, woodburning and heating oils since they would not be burned during a typical ozone day. According to Vol. 1 T.5.8-1, industrial fuel use is seasonally uniform, but commercial/institutional use has a factor of .6 during the ozone season and 1.4 during the CO season. Statewide fuel use was apportioned to counties based on 1990 population distribution.

Statewide NOx, CO and VOC emissions were calculated using the fuel usage and activity factors and are seasonally adjusted in Table B.4-1.

B.4-i COAL CONSUMPTION

Coal consumption is broadly classified into two major types: bituminous and anthracite. Two other minor types of coal are sub-bituminous and lignite. Anthracite coal is of a higher grade and has more fixed carbon and is less volatile than bituminous coal. Anthracite coal is used mainly in residential boilers for heating and emissions are only calculated for the winter. Anthracite coal is also used in commercial boilers and bituminous and lignite coal is used mainly in industrial and electric utility boilers throughout the year.

Emissions for VOC, NOx and CO in tons per year are adjusted for the summer and winter based on Vol. 1 Table 5.8-1. Emissions are calculated for the state by the various fuel SCC codes for AMS input in Appendix Tables B.4-1 to B.4-23. Table B.4-1 is the first page of this appendix and is presented here for illustration. Table B.4-2 summarizes the fuel use emissions by fuel type and Table B.4-3 presents the emissions by county based on population.

B.4-ii FUEL OIL CONSUMPTION

Fuel consumption covers two major types of oil: distillate and residual oils. Distillate oil includes #1, 2, and 4 oils and are used mainly in residential and commercial boilers. Residual oil comprises #5 and 6 oils which are used in industrial boilers. Kerosene is another significant source of fuel used in the state in 1989. Consumption estimates are derived from EIA[4] Table 145 to 147 and emission factors are from AP42 T.1.3-1[5].

B.4-iii KEROSENE

The VOC emission factor for kerosene which is one of the lighter fuels, was taken from NAPAP[6] as recommended in Comment 47 in EPA's 3/5/90 response to the 1987 Draft Inventory. According to EIA[4] a significant quantity of kerosene was consumed in 1990.

B.4-iv NATURAL GAS AND LIQUID PETROLEUM GAS (LPG) CONSUMPTION

The EIA[4] provides the estimated consumption of natural gas and LPG for Massachusetts for 1990; hence, there is no need to use the equation given in Volume 1 Section 4.7-3. Emission factors are obtained from AP-42 T.1.4-1[5] and T. 1.5-1. Residential emissions are also calculated for a typical ozone summer day and Vol. 1 Table 5.8-1 gives a summer seasonal adjustment factor of 0.3.

B.4-v WOODBURNING

Residential

The data for wood burning for home heating in Massachusetts was obtained from the State Division of Forests and Parks:[1,2] This Division together with the Berkshire/Pioneer Valley Project sponsored a study entitled "Woodburning Among Massachusetts Residents 1981-1982".[1] For 1982, 1.201 million cords of wood was burnt and that was the last year that actual wood-burning data was available. There were no studies since then, and the succeeding years 1983 to 1987 had to be estimated based on a memorandum from David Fraser and Douglas Leab of that Division.[9] According to Mr. Fraser, the amount of wood burned remained about the same for 1983 but declined by 30% in 1984, 10% in 1985 and 10% in 1986. According to Doug Leab in a recent correspondence of the same Division, the total amount of cords burnt for the 1989/90 and 1990/91 heating season was 539,170 and 628,600 cords respectively. The average of these two heating seasons is the estimate for calendar year 1990 at 583,885 cords. The following is the estimated values for woodburning in the state since the 1982 comprehensive study.

1982 - 1,201,000 cords of wood
1983 - 1,201,000 cords of wood (same as 1982)
1984 - 840,000 cords of wood (declined by 30%
1985 - 756,630 cords of wood (declined by 10%)
1986 - 680,967 cords of wood (declined by 10%)
1987 - 680,967 cords of wood (same as 1986).
1988/89 - 447,780 cords of wood
1989/90 - 539,170 cords of wood
1990/91 - 628,600 cords of wood
1990 - 583,885 cords of wood

To Convert Cords of Wood to Tons

Hardwoods generally weigh about 1.9 tons per cord and softwoods 1.17 tons per cord.[14] Each cord is about 128 cubic ft. Firewood, as burned, is usually about 20% water by weight. The water weight should not be deducted from the total weight in calculating emissions because AP-42 emission factors assume 15-40% water weight.[6] According to the Division of Forestry and Parks and the Berkshire Pioneer Valley Project,[1] hard woods (such as oak) account for 91.3% of firewood used in Massachusetts and soft wood (pine) accounts for the rest. This study also indicated that 84% of woodburning is done in woodstoves and 16% in fireplaces.

Hardwood - 91.3% X 583,885 cords = 533,087 cords X 1.9 tons/cord
= 1,012,865 Tons

Softwood - 8.7% X 583,885 cords = 50,798 X 1.17 tons/cord
= 59,434 Tons

Total wood burned = 1,072,299 Tons
Woodstoves (84%) = 900,731 Tons
Fireplaces (16%) = 171,568 Tons

Woodstoves

900,731 Tons Wood X 28 lb/VOC ton/2,000 lbs = 12,610.23 Tons VOC
X 2.8 lb NOx/Ton/2,000 lbs = 1,261.02 Tons NOx
X 230.8 CO/Ton/2,000 lbs = 103,944.36 Tons CO
Peak CO Season = 900,731 Tons Wood X 151/182 = 747,310 Tons
747,310 Tons Wood X 230.8 lb CO/Ton/2,000 lbs/151 = 571.12 TPWD

Fireplaces

171,568 Tons Wood X 26.0 lb/VOC/ton/2,000 lbs = 2,230.38 Tons VOC
X 1.8 lb NOx/ton/2,000 lbs = 154.41 Tons NOx
X 122.2 lb CO/ ton/2,000 lbs = 10,482.80 Tons CO

Peak CO season = 171,568 Tons Wood X 151/182 = 142,345 Tons Wood

142,345 Tons Wood X 122.2 lb CO/ton/2,000 lbs/151 = 57.6 TPWD

Since wood stoves and fireplaces are used only in the heating season, it is unlikely that there are any emissions on a typical ozone day. Woodstove and fireplace emissions are adjusted for a typical winter day and presented in Appendix Tables B.4-5 and B.4-6.

Commercial/Industrial Woodburning

The amount of woodburning in commercial/industrial facilities was obtained from the Massachusetts Division of Forest and Parks in Lancaster. John Breed of this office provided a listing by facility, of the amount of wood and wood products burned for the year 1987. Since this office no longer maintained this data, an estimate had to be made for 1990 based on the 7.7% decline from 1987 to 1990 as reported in Doug Leab's estimation. The estimated total amount of wood burned (mainly chips) for fuel for 1987 was 425,713 tons and this according to Mr. Breed accounted for about 90% of the reported facilities. To account for the facilities with missing data, the total 1987 tonnage was added by 10% for a final total of 468,284 tons. The estimated tonnage for 1990 based on the 7.7% total woodburning decline from 1987, amount to 432,226 tons.

The following is the VOC, NOx and CO calculations from commercial/industrial woodburning for 1990 and presented in the industrial section of Appendix Table B.4-23.

```
415,647 tons wood X 1.4 lb VOC/ton  =   290.95 TPY
                  X 2.8 lbs NOx/ton =   581.91 TPY
                  X 47.0 lbs CO/ton = 9,767.70 TPY
```

Emission Factors were derived from AP-42 T.1.6-1[5] and NAPAP p. 32.[6]

There is no seasonal adjustment as commercial/industrial use is assumed to be uniform throughout the year as provided in Volume 1 T.5.8-1.

B.4-vi RESIDENTIAL FUEL CONSUMPTION

Residential fuel consumption includes bituminous and anthracite coal, distillate oil, natural gas, woodstove and fireplaces, kerosene and liquid petroleum gas (LPG). Residential fuel usage was obtained from DOE/EIA Table 145.[4] The statewide fuel use was apportioned to counties posed on population obtained from the 1990 US Census.[20] The CO non-attainment towns were also apportioned based on the census population.

Residential fuel emissions are estimated in Appendix Tables B.4-1 to B.4-8. The annual fuel usage was estimated for the peak ozone period (June to August) which was used in the On-Road Mobile Section. The peak ozone period or summer activity for most residential fuel is negligible because most fuel is used for winter heating. Natural gas and LPG are generally used throughout the year for cooking and heating and are given an activity factor of 0.3 for the summer in Volume 1 Table 5.8-1.

The peak CO period as used in the On-Road Mobile Section covers October to February i.e. a period of 5 months or 151 days. The winter heating season generally lasts from October to March i.e. a period of 6 months or 182 days. The activity factor for residential heating fuel is derived by using the proportion of the peak CO period from the winter heating period (151/182).

The following is the emission calculation for Residential bituminous coal as shown in Appendix Table B.4-1:

12,000 tons coal X 10 lb VOC/ton = 120,000 lbs/2,000 lbs = 60 TPY

X 3 lb NO_x/ton = 36,000 lbs/2,000 lbs = 18 TPY

X 90 lb CO/ton = 1,080,000 lbs/2,000 lbs = 540 TPY

Peak ozone emissions: No activity

Peak CO emissions: 12,000 X 151/182 = 9,956 Tons Coal

9,956 Tons X 90 lb/ton = 896,040 lbs/2,000 lbs = 448.02 Tons

/151 days = 2.967 TPWD CO

Residential fuel use emissions are presented in Appendix Tables B.4-1 to B.4-8 comprising other fuels such as oil, gas and wood. The peak CO emissions were apportioned to towns based on population. Residential fuel emissions are summarized statewide and presented in Table B.4-1 and B.4-2.

B-4-vii COMMERCIAL/INSTITUTIONAL AND INDUSTRIAL FUEL CONSUMPTION

Emissions from commercial/institutional and industrial fuel consumption were estimated similarly to residential fuel use. One of the major differences is the subtraction of the SSEIS point source fuel usage from that reported in the DOE/EIA.[4] SSEIS fuel use was extracted by SCC Codes for each fuel category and subtracted from each fuel use category.

The other difference from residential calculations is that the seasonal adjustment factors are derived from Volume 1 Table 5-8-1.[7] For commercial/institutional fuel use, the peak ozone activity is 0.6 whereas the peak CO activity is 1.4. The activity is at 6 days a week i.e. 312 days per year. The peak ozone period is 3 months or 12 weeks which at 6 days per week equal 72 days. Similarly, the peak CO activity at 6 days per week for 5 months or 20 weeks equals 120 days. These seasonal adjustments are utilized in Appendix Tables B.4-9 to B.4-15.

Industrial fuel consumption according to Volume 1 Table 5.8-1 is uniform throughout the year at 6 days per week. Peak ozone and CO season day emissions are adjusted for 72 days and 120 days, respectively, and are calculated in Appendix Tables B.4-16 to B.4-23.

Residential, commercial/institutional and industrial emissions are summarized by fuel type statewide in Table B.4-2. Total fuel emissions are apportioned to counties based on population and presented in Table B.4-3.

The following are the emissions estimation for small stationary fuel use as presented in Tables B.4-2 and B.4-3.

VOC	16,301.23	TPY	or	1.986	TPSD		
NOx	26,844.03	TPY	or	32.14	TPSD		
CO	131,025.93	TPY	or	37.575	TPSD	or	693.598 TPWD

B.4-viii FOREST/NON-FOREST AND STRUCTURAL FIRES

This category includes emissions from miscellaneous sources such as forest fires, structural fires, agricultural burning, slash and prescribed burning, and orchard heaters. Agricultural burning, sla and prescribed open burning are included in this inventory and are combined into one category as Forest/Non-Forest Fires. Volume 1, section 4.6-3[7] suggests that agricultural burning, in some cases may be reported under residential open burning. Orchard heaters are also not covered in this inventory because several sources including the University of Massachusetts Farm Extension Service[18] reported that they are not used in Massachusetts. Only large electric fans and helicopters are used in frost conditions overnight to circulate the air. Orchard heaters are predominantly used in the citrus growing areas of Florida and California.[18]

Forest/Non-Forest Fires

Forest fires are major sources of organic emissions and mostly occur during the peak ozone season. Forest fire data was obtained from two sources: the Massachusetts Department of Public Safety State Fire Marshall's Office[17] and the State Division of Forest and Parks, Bureau of Fire Control.[16] Forest fire data was presented monthly in acres burned for fiscal years July 1989 to June 1990. Forest fire data by acreage amounted to 3,508 acres burned.

The fuel loading factor of 11 ton per acre for the Eastern/North Central Region was obtained from AP-42 Table 11.1-1.

Emission factors for forest wild fires for the North Central and Eastern Regions for each pollutant were obtained from AP-42 Table 11.1-2[5] in kg/hectare converted to lb/acre and these were applied to the county acreage of forest vegetation burned. The forest fires in the summer (June, July and August) amounted to 7.43% of the total acreage burned in 1989/90. Peak CO winter fires (October to February) account for 10.8%

of acreage burned. The following is the VOC emission calculations for forest fires for the State of Massachusetts:

1 kg = 2.2046 lbs
1 Mg = 1.1023 Tons
1 hectare = 2.471 Acres

296 kg VOC per hectare/25 Mg fuel per hectare = 11.84 kg VOC/Mg fuel
= 22.96 lb VOC per Ton fuel X 11 ton fuel per acre X 3,508 acres
= 442.99 TPY VOC X .0743/92 = 0.358 TPSD VOC

49 kg NO$_x$ per hectare/25 Mg fuel per hectare = 1.96 kg NO$_x$/Mg fuel
= 1.78 lb NO$_x$ per ton fuel X 11 ton fuel per acre X 3,508 acres
= 34.34 TPY NO$_x$ X .0743/92 = 0.028 TPSD NO$_x$

1,730 kg CO/hectare/25 Mg fuel/hectare = 138.4 lb CO/Ton fuel
X 11 ton/acre X 3,508 acres = 2,670.29 Tons Co
X .0743/92 = 2.157 TPSD CO
X .108/151 = 1.91 TPWD CO

Forest fire emissions are presented by counties in TPY and TPSWD for VOC, CO, and NOx and TPWWD for CO in Tables B.4-4 and B.4-5.

STRUCTURAL FIRES

Building or structural fires are significant sources of organic emissions. Estimates of the amount of material burned is obtained by multiplying the number of structural fires by a fuel loading factor of 6.8 tons of material per fire as recommended in Volume 1 Section 4.6-4.

Structural fire data was obtained from the Massachusetts Department of Safety, State Fire Marshall's Office.[17] Data was presented by county by the amount of fires per month in 1990. This data indicated that 22.4% of the fires occurred during the peak ozone season (June, July, and August) and 44.1% occurred during the winter months peak CO season from October to February. Since the emission factors were not given in either Volume 1 or AP-42, it was obtained from EPA Region 1, Boston

(19): VOC 11.0 lb/ton, NOx 1.4 lb/ton, and CO 60 lb/ton and Volume 1 Section 4.8-4.

The following is the calculation of emissions from structural fires:

27,596 s. fires X 6.8 tons fuel/fire = 187,652.8 tons fuel
X 11.0 lb VOC/1,000/ton = 1,032.09 tons VOC

Summer day emissions = 1,032.09 X .224/92 = 2.513 TPSD

187,652.8 X 1.4 lb NOx/ton = 131.36 TPY or 0.32 TPSD

187,652.8 X 60 lb CO/ton = 5,629.58 TPY X .224/92 = 13.707 TPSD or 5,629.58 X .441/151 = 16.441 TPWD

Statewide emissions were calculated by counties according to number of structural fires in each county and are presented in Tables B.4-6 and B.4-7 in TPY, TPSD and TPWD.

B.4-ix BACKYARD CHARCOAL GRILLS

Organic gases are emitted when charcoal lighter fluid is used to soak and light charcoal briquettes in backyard grills. The lighter fluid is composed almost entirely of volatile constituents such as naphta and petroleum distillates. Some VOC are also emitted during the combustion of charcoal. EPA's Air and Energy Engineering Research Laboratory (AEERL) together with the South Coast Air Qality Management District (SCAQMD) and the Barbeque Industry Assoc.(BIA), provided a national emissions estimate as follows: 1,110 tpy VOC from lighter fluid and 14,500 tpy VOC from evaporation and conbustion combined.[22]

The AEERL national emissions were appportioned to Massachusetts based on population. The report recommends state estimates to be apportioned to counties using single family dwellings. Also, about 80%

of the annual national estimates of lighter fuel is consumed in the ozone season. The estimated emissions also include charcoal grills used in parks and other recreational areas.

The following is the emissions estimation for Massachusetts:

14,500 tons VOC /248,709,873 US pop 1990 x 6,016,425 Mass pop
= 350.76 tpy x .8 (summer) = 280.61 /92 = 3.05 tpsd VOC.

Emissions are presented by counties in Table B.4-7.

B.4-x COMMERCIAL CHARBROILING

This category was also estimated using the AEERL report.[22] Charbroilers are used by restaurants to cook steaks, hamburgers, chicken and other foods in which the grease from the meat falls on the surface and produces VOC. Combustion of the fuel used such as charcoal and to a small extent, natural gas, produces emissions which are also included in the estimate. Approximately 9% of restaurants use meat firing grills which has an emissions factor of 1,000 lb/VOC per year per restaurant.

The AEERL recommended using County Business Patterns to obtain the number of restaurants. SIC 58 and 70 eating/drinking establishments and hotels respectively, were used and amounted to a total of 12,172 restaurants in 1990.

The following is the emissions estimation for VOC's:

12,172 restaurants x 0.09 charbroilers x 1,000 lb VOC = 547.74 TPY
/365 = 1.501 TPSD

Emissions are presented by county in Table b.4-8.

B.4-xi MISCELLANEOUS COMBUSTION

Slash burning and other agricultural burning are inventoried as part of the Forest/Non Forest Fire Section. Open Burning, Prescribed Burning or Residential/commercial Incineration are not permitted during the ozone season and is not applicable for the inventory for ozone precursors. According to the Massachusetts Open Burning Regulation 310 CMR 7.07, Open Burning is only permitted between January 15 to May 1. Because open/prescribed burning is generally considered to be a rural/suburban activity, the CO emissions for the CO non-attainment cities and towns would be considered to be negligible.

```
                    TABLE B.4-1   RESIDENTIAL BITUMINOUS COAL EMISSIONS 1990
amsbcoal
   SCC :       21-04-002-000
              STATIONARY SOURCE FUEL COMBUSTION
              RESIDENTIAL :   BITUMINOUS COAL

   STATE ACTIVITY LEVEL :      12,000      TONS

   COUNTY ACTIVITY LEVEL :            ANNUAL   OZ PO    CO PC     VOC TPY VOC PO    NOX TPY  NOX PO     CO TPY  CO PO  CO PC
   ---------------------              COUNTY  COUNTY    ACTIV       EM.EF   TPSD     EM.FAC    TPSD     EM.FAC   TPSD   TPWD
   COUNTIES   POP 1990     %        ACTIVITY   ACTIV  151/182    10LB/TON    * 0     3 LB/TN    * 0   90 LB/TN    * 0  /151
   ========  =========  ====         =======  ======  =======    ========  =====    ========  ======   ======== ====  =====
 1 BARNSTABLE   186605   3.1%         372.19     0.0    308.8        1.86   0.00        0.56    0.00      16.75  0.00   0.09
 2 BERKSHIRE    139352   2.3%         277.94     0.0    230.6        1.39   0.00        0.42    0.00      12.51  0.00   0.07
 3 BRISTOL      506325   8.4%        1009.89     0.0    837.9        5.05   0.00        1.51    0.00      45.44  0.00   0.25
 4 DUKES         11639   0.2%          23.21     0.0     19.3        0.12   0.00        0.03    0.00       1.04  0.00   0.01
 5 ESSEX        670080  11.1%        1336.50     0.0   1108.9        6.68   0.00        2.00    0.00      60.14  0.00   0.33
 6 FRANKLIN      70092   1.2%         139.80     0.0    116.0        0.70   0.00        0.21    0.00       6.29  0.00   0.03
 7 HAMPDEN      456310   7.6%         910.13     0.0    755.1        4.55   0.00        1.37    0.00      40.96  0.00   0.23
 8 HAMPSHIRE    146568   2.4%         292.34     0.0    242.5        1.46   0.00        0.44    0.00      13.16  0.00   0.07
 9 MIDDLESEX   1398468  23.2%        2789.30     0.0   2314.2       13.95   0.00        4.18    0.00     125.52  0.00   0.69
10 NANTUCKET      6012   0.1%          11.99     0.0      9.9        0.06   0.00        0.02    0.00       0.54  0.00   0.00
11 NORFOLK      616087  10.2%        1228.81     0.0   1019.5        6.14   0.00        1.84    0.00      55.30  0.00   0.30
12 PLYMOUTH     435276   7.2%         868.18     0.0    720.3        4.34   0.00        1.30    0.00      39.07  0.00   0.21
13 SUFFOLK      663906  11.0%        1324.19     0.0   1098.6        6.62   0.00        1.99    0.00      59.59  0.00   0.33
14 WORCESTER    709705  11.8%        1415.53     0.0   1174.4        7.08   0.00        2.12    0.00      63.70  0.00   0.35

   STATE       6016425 100.0%       12000.00     0.0   9956.0       60.00   0.00       18.00    0.00     540.00  0.00   2.97

ACTIVITY LEVEL UNITS :        TONS                                                                     ANNUAL ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                      NON-ATT   COUNT      TOWN  COUNTY     %TOWN   TOWN   TOWN    TOWN   TPWD
ACTIVITY LEVEL METHOD :                                     TOWNS              POPUL   POPUL     /CNTY  ACTIV CO TPY   ACTIV  /151
                                                          =======   =====  ======== =======    ====== ====== ====== ======= ======
PEAK OZ DAYS/WEEK :            0                           BOSTON   SUFFO    574283  663906     86.5%1145.4  51.54   950.3   0.28
PEAK OZ WEEKS/YEAR :           0      PO THROUGHPUT : 0%  CAMBRIDGE   MIDSE     95802 1398468      6.9% 191.1   8.60   158.5   0.05
                                                           QUINCY   NORFO     84985  616087     13.8% 169.5   7.63   140.6   0.04
PEAK CO DAYS/WEEK :            7                          MEDFORD   MIDSE     57407 1398468      4.1% 114.5   5.15    95.0   0.03
PEAK CO WEEKS/YEAR :          20      PC THROUGHPUT: 83%   REVERE   SUFFO     42786  663906      6.4%  85.3   3.84    70.8   0.02
                                                           MALDEN   MIDSE     53884 1398468      3.9% 107.5   4.84    89.2   0.03
EMISSION FACTORS :       VOC:  10.0                       CHELSEA   SUFFO     28710  663906      4.3%  57.3   2.58    47.5   0.01
                         NOX:  3.0                        EVERETT   MIDSE     35701 1398468      2.6%  71.2   3.20    59.1   0.02
                         CO:   90.0                    SOMERVILLE   MIDSE     76210 1398468      5.4% 152.0   6.84   126.1   0.04
EMISSION FACTOR UNITS :       LB/TON  AP-42 TABLE 1.1-1                                  TOTAL MET.BOSTON          94.22 1737.17   0.52
                                                        WORCESTER   WORCE    169759  709705     23.9% 338.6  15.24   280.9   0.08
RULE EFFECTIVENESS :           N/A                    SPRINGFIELD   HAMPD    156983  456310     34.4% 313.1  14.09   259.8   0.08
RULE PENETRATION :             N/A                         LOWELL   MIDSE    103439 1398468      7.4% 206.3   9.28   171.2   0.05
SIP RULE :                     NO                         WALTHAM   MIDSE     57878 1398468      4.1% 115.4   5.19    95.8   0.03

PO INTERVAL :                  1 HR
PC INTERVAL :                  8 HR

WEEKDAY:       70 %      SAT : 15 %       SUN :      15 %

COMMENTS:      NO SUMMER ACTIVITY, WINTER OCTOBER TO MARCH, PC THRUPUT OCT-FEB (TABLE C.4 MOBILE SECTION)
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TABLE B.4-2

SMALL STATIONARY FUEL EMISSIONS 1990 VOC, NOX AND CO -STATEWIDE

fueltot

FUEL TYPE	VOC TPY	VOC TPSD	NOX TPY	NOX TPSD	CO TPY	CO TPSD	CO TPWD
RESIDENTIAL							
1 BITUM.COAL	60.00	0.000	18.00	0.000	540.00	0.000	2.970
2 ANTHR.COAL	85.00	0.000	24.50	0.000	765.00	0.000	4.200
3 DISTIL.OIL	258.84	0.000	6534.49	0.000	1815.14	0.000	9.970
4 NAT.GAS	283.55	0.230	5350.00	4.400	1070.00	0.880	4.980
5 WOOD STOVE	12610.23	0.000	1261.02	0.000	103944.36	0.000	571.12
6 WOOD FIREPL	2230.38	0.000	154.41	0.000	10482.80	0.000	57.600
7 KEROSENE	109.88	0.050	1605.39	0.700	349.15	0.150	1.730
8 LPG	13.83	0.011	259.51	0.213	52.76	0.043	0.246
TOTAL	15651.71	0.291	15207.32	5.313	119019.20	1.073	652.816
COMMERCIAL/INSTITUTIONAL							
9 BITUM.COAL	9.50	0.018	69.39	0.133	80.35	0.155	0.361
10 ANTHR. COA	7.80	0.015	60.00	0.086	3.60	0.007	0.016
11 DISTIL.OIL	36.65	0.070	2155.66	4.146	538.92	1.036	2.418
12 RESID.OIL	61.44	0.118	2990.30	5.751	271.85	0.523	1.220
13 NAT.GAS	98.11	0.189	1851.10	3.560	370.22	0.712	1.661
14 KEROSENE	85.61	0.165	1250.82	2.405	272.03	0.523	1.536
15 LPG	2.38	0.005	44.72	0.086	9.09	0.017	0.041
TOTAL	301.49	0.58	8421.99	16.167	1546.06	2.973	7.253
INDUSTRIAL							
16 BITUM.COAL	0.56	0.002	1.56	0.360	40.16	0.129	0.129
17 ANTHR.COAL	0.11	0.000	27.00	0.087	7.50	0.024	0.024
18 DISTIL.OIL	4.20	0.013	420.44	1.348	105.11	0.337	0.337
19 RESID.OIL	0.00	0.000	0.00	0.000	0.00	0.000	0.000
20 NAT.GAS	34.98	0.112	1749.23	5.607	437.31	1.402	1.402
21 KEROSENE	12.10	0.039	177.28	0.568	38.56	0.124	0.124
22 LPG	5.13	0.016	257.29	0.825	64.32	0.206	0.206
23 WOOD PROD	290.95	0.933	581.91	1.865	9767.70	31.307	31.307
TOTAL	348.03	1.115	3214.713	10.660	10460.66	33.529	33.529
TOTAL FUEL	16301.23	1.986	26844.03	32.140	131025.93	37.575	693.598

TABLE B.4-3

SMALL STATIONARY FUEL EMISSIONS 1990 VOC, NOX AND CO - BY COUNTY

fuelcnty3

	COUNTIES	POP 1990	PERCENT	VOC TPY	VOC TPSD	NOX TPY	NOX TPSD	CO TPY	CO TPSD	CO TPWD
				16301.23	1.986	26844.03	32.14	131025.93	37.575	693.598
1	BARNSTABLE	186605	3.1%	505.60	0.062	832.59	0.997	4063.89	1.165	21.513
2	BERKSHIRE	139352	2.3%	377.57	0.046	621.76	0.744	3034.81	0.870	16.065
3	BRISTOL	506325	8.4%	1371.86	0.167	2259.12	2.705	11026.76	3.162	58.371
4	DUKES	11639	0.2%	31.54	0.004	51.93	0.062	253.47	0.073	1.342
5	ESSEX	670080	11.1%	1815.55	0.221	2989.76	3.580	14593.03	4.185	77.250
6	FRANKLIN	70092	1.2%	189.91	0.023	312.74	0.374	1526.47	0.438	8.080
7	HAMPDEN	456310	7.6%	1236.35	0.151	2035.96	2.438	9937.54	2.850	52.605
8	HAMPSHIRE	146568	2.4%	397.12	0.048	653.96	0.783	3191.96	0.915	16.897
9	MIDDLESEX	1398468	23.2%	3789.09	0.462	6239.67	7.471	30455.89	8.734	161.221
10	NANTUCKET	6012	0.1%	16.29	0.002	26.82	0.032	130.93	0.038	0.693
11	NORFOLK	616087	10.2%	1669.26	0.203	2748.85	3.291	13417.17	3.848	71.025
12	PLYMOUTH	435276	7.2%	1179.36	0.144	1942.11	2.325	9479.46	2.718	50.180
13	SUFFOLK	663906	11.0%	1798.82	0.219	2962.21	3.547	14458.57	4.146	76.538
14	WORCESTER	709705	11.8%	1922.91	0.234	3166.56	3.791	15455.98	4.432	81.818
	STATE	6016425	100.0%	16301.23	1.986	26844.03	32.140	131025.93	37.575	693.598

TABLE B.4-4

FOREST/NON FOREST FIRE EMISSIONS 1990 VOC, NOX AND CO

forestf3

FUEL LOADING = 11 TONS PER ACRE (AP-42 T.11.1-1)

COUNTIES	1990 ACRES	TPY VOC EMISSIONS EF22.96*11 LB/ACRE	TPSD VOC EMISS *.0743 /92	TPY CO EMISSIONS EF1730*11 LB/ACRE	TPSD CO EMISSIONS *.0743 /92	TPWD CO EMISS *.108 /151	TPY NOX EMISSIONS 1.78 LB*11 /ACRE	TPSD NOX EMISSIONS *.0743 /92
BARNSTABLE	216.00	27.28	0.022	164.42	0.133	0.118	2.11	0.002
BERKSHIRE	294.25	37.16	0.030	223.98	0.181	0.160	2.88	0.002
BRISTOL	333.75	42.15	0.034	254.05	0.205	0.182	3.27	0.003
DUKES	148.75	18.78	0.015	113.23	0.091	0.081	1.46	0.001
ESSEX	437.50	55.25	0.045	333.03	0.269	0.238	4.28	0.003
FRANKLIN	168.50	21.28	0.017	128.26	0.104	0.092	1.65	0.001
HAMPDEN	550.75	69.55	0.056	419.23	0.339	0.300	5.39	0.004
HAMPSHIRE	373.25	47.13	0.038	284.12	0.229	0.203	3.65	0.003
MIDDLESEX	230.00	29.04	0.023	175.08	0.141	0.125	2.25	0.002
NANTUCKET	124.75	15.75	0.013	94.96	0.077	0.068	1.22	0.001
NORFOLK	231.00	29.17	0.024	175.84	0.142	0.126	2.26	0.002
PLYMOUTH	244.00	30.81	0.025	185.73	0.150	0.133	2.39	0.002
SUFFOLK	0.00	0.00	0.000	0.00	0.000	0.000	0.00	0.000
WORCESTER	155.00	19.57	0.016	117.99	0.095	0.084	1.52	0.001
STATE	3507.50	442.93	0.358	2669.91	2.156	1.910	34.34	0.028
QC	3507.50	442.93	0.358	2669.91	2.156	1.910	34.34	0.028

TABLE B.4-5 FOREST/NONFOREST FIRES EMISSIONS 1990

```
ffire3
SCC :       28-10-001-000
            FOREST/NON FOREST FIRES

   STATE ACTIVITY LEVEL :      3,508  ACRES BURNED       FUEL LOADING FACTOR = 11 TONS PER ACRE (AP42 T.11.1-1)

   COUNTY ACTIVITY LEVEL :        ANNUAL   ANNUAL      OZ PO     CO PC VOC TPY  VOC PO NOX TPY   NOX PO   CO TPY  CO PO   CO PC
   ---------------------        ACTIVITY ACTIVITY      ACTIV ACTIVITY  EM.FAC    TPSD  EM.FAC    TPSD    EM.FAC   TPSD   TPWD
   COUNTIES    POP 1990    %     ACRES *11=TONS    *.0743     *.108  22.96LB    /92   1.78LB     /92   138.4 LB   /92   /151
   ========  =========  ====  =======  =======    =======   ======= ======  ======  ======= =======  =======  =====   ======
 1 BARNSTABLE   186605   3.1%      216     2376        177       257   27.28   0.022     2.11   0.002   164.42  0.133   0.118
 2 BERKSHIRE    139352   2.3%      294     3234        240       349   37.13   0.030     2.88   0.002   223.79  0.181   0.160
 3 BRISTOL      506325   8.4%      334     3674        273       397   42.18   0.034     3.27   0.003   254.24  0.205   0.182
 4 DUKES         11639   0.2%      149     1639        122       177   18.82   0.015     1.46   0.001   113.42  0.092   0.081
 5 ESSEX        670080  11.1%      437     4807        357       519   55.18   0.045     4.28   0.003   332.64  0.269   0.238
 6 FRANKLIN      70092   1.2%      169     1859        138       201   21.34   0.017     1.65   0.001   128.64  0.104   0.092
 7 HAMPDEN      456310   7.6%      551     6061        450       655   69.58   0.056     5.39   0.004   419.42  0.339   0.300
 8 HAMPSHIRE    146568   2.4%      373     4103        305       443   47.10   0.038     3.65   0.003   283.93  0.229   0.203
 9 MIDDLESEX   1398468  23.2%      230     2530        188       273   29.04   0.023     2.25   0.002   175.08  0.141   0.125
10 NANTUCKET      6012   0.1%      125     1375        102       149   15.79   0.013     1.22   0.001    95.15  0.077   0.068
11 NORFOLK      616087  10.2%      231     2541        189       274   29.17   0.024     2.26   0.002   175.84  0.142   0.126
12 PLYMOUTH     435276   7.2%      244     2684        199       290   30.81   0.025     2.39   0.002   185.73  0.150   0.133
13 SUFFOLK      663906  11.0%        0        0          0         0    0.00   0.000     0.00   0.000     0.00  0.000   0.000
14 WORCESTER    709705  11.8%      155     1705        127       184   19.57   0.016     1.52   0.001   117.99  0.095   0.084
                                             0                          0.00   0.000     0.00   0.000     0.00  0.000   0.000
   STATE       6016425 100.0%     3508    38588       2867      4168  442.99   0.358    34.34   0.028  2670.29  2.157   1.910

ACTIVITY LEVEL UNITS :       ACRES/TONS                                                             ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :     BURNED                     NON-ATT   COUNTY   TOWN  COUNTY    %TOWN    ACTIV CO TPY   ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                   TOWNS            POPUL   POPUL    /CNTY     TONS  *138.4  ACRES/TONS /151
                                                        =======  ====================  ======    ===== ======= ======= ======
PEAK OZ DAYS/WEEK :          7                           BOSTON  SUFF25 574283  663906    86.5%        0    0.00       0  0.000
PEAK OZ WEEKS/YEAR :         52      PO THRUPUT : 7.4 % CAMBRIDGE MIDX21  95802 1398468     6.9%      173   11.99      19  0.009
                                                         QUINCY  NORF23  84985  616087    13.8%      351   24.26      38  0.017
PEAK CO DAYS/WEEK :          7                          MEDFORD  MIDX21  57407 1398468     4.1%      104    7.19      11  0.005
PEAK CO WEEKS/YEAR :         52      PC THRUPUT : 6.4 %  REVERE  SUFF25  42786  663906     6.4%        0    0.00       0  0.000
                                                         MALDEN  MIDX21  53884 1398468     3.9%       97    6.75      11  0.005
EMISSION FACTORS :     VOC:  22.96                      CHELSEA  SUFF25  28710  663906     4.3%        0    0.00       0  0.000
                       NOX:  1.78                       EVERETT  MIDX21  35701 1398468     2.6%       65    4.47       7  0.003
                       CO:   138.4                    SOMERVILL  MIDX21  76210 1398468     5.4%      138    9.54      15  0.007
EMISSION FACTOR UNITS :      LB/TON  (ACRE*11=TON)                                 TOTAL MET.BOSTON      64.19     100  0.046
                                     AP42 T.11.1-1+2  WORCESTER  WORC26 169759  709705    23.9%      408   28.22      44  0.020
RULE EFFECTIVENESS :         N/A                      SPRINGFIE  HAMD19 156983  456310    34.4%     2085  144.29     225  0.103
RULE PENETRATION :           N/A                         LOWELL  MIDX21 103439 1398468     7.4%      187   12.95      20  0.009
SIP RULE :                   NO                         WALTHAM  MIDX21  57878 1398468     4.1%      105    7.25      11  0.005

PO INTERVAL :                1 HR
PC INTERVAL :                8 HR

WEEKDAY:        86%     SAT : 7 %     SUN :      7 %
                                                       (AMS SHORTLIST)
COMMENTS:      SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT DEC-FEB
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structf3

TABLE B.4-6

STRUCTURAL FIRES EMISSIONS 1990 TPY, TPSD AND TPWD

COUNTIES	1990 STRUCT FIRES	FUEL LOAD 6.8T/F	TPY VOC EMISSION EF 11LB * TON	TPSD VOC EMISS .224 /92	TPY NOX EMISSION 1.4LB/TON	TPSD NOX EMISSION .224 /92	TPY CO EMISSION 60 LB/TON	TPSD CO EMISSION *.224 /92	WINTER TPWD CO EMISS .441 /151
BARNSTABL	850	5780	31.79	0.077	4.05	0.010	173.40	0.422	0.506
BERKSHIRE	770	5236	28.80	0.070	3.67	0.009	157.08	0.382	0.459
BRISTOL	3339	22705.2	124.88	0.304	15.89	0.039	681.16	1.658	1.989
DUKES	40	272	1.50	0.004	0.19	0.000	8.16	0.020	0.024
ESSEX	2610	17748	97.61	0.238	12.42	0.030	532.44	1.296	1.555
FRANKLIN	236	1604.8	8.83	0.021	1.12	0.003	48.14	0.117	0.141
HAMPDEN	2691	18298.8	100.64	0.245	12.81	0.031	548.96	1.337	1.603
HAMPSHIRE	333	2264.4	12.45	0.030	1.59	0.004	67.93	0.165	0.198
MIDDLESEX	2995	20366	112.01	0.273	14.26	0.035	610.98	1.488	1.784
NANTUCKET	67	455.6	2.51	0.006	0.32	0.001	13.67	0.033	0.040
NORFOLK	2221	15102.8	83.07	0.202	10.57	0.026	453.08	1.103	1.323
PLYMOUTH	1910	12988	71.43	0.174	9.09	0.022	389.64	0.949	1.138
SUFFOLK	6892	46865.6	257.76	0.628	32.81	0.080	1405.97	3.423	4.106
WORCESTER	2642	17965.6	98.81	0.241	12.58	0.031	538.97	1.312	1.574
STATE	27596	187652.8	1032.09	2.513	131.36	0.320	5629.58	13.707	16.441
qc	27596	187652.8	1032.09	2.513	131.36	0.320	5629.584	13.707	16.441

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                   TABLE B.4-7  STRUCTURAL FIRES EMISSIONS 1990
stfire3
   SCC :      28-10-030-000
             STRUCTURAL FIRES


   STATE ACTIVITY LEVEL :      27,596 NUMBER OF FIRES

   COUNTY ACTIVITY LEVEL :      ANNUAL   ANNUAL     OZ PO    CO PC VOC TPY  VOC PO NOX TPY  NOX PO  CO TPY   CO PO   CO PC
   ---------------------     ACTIVITY ACTIVITY     ACTIV ACTIVITY  EF 11LB   TPSD  EF 1.4   TPSD   EF 60    TPSD    TPWD
   COUNTIES   POP 1990   %      FIRES  *6.8=TON *.224    *.441     TON      /92  LB/TON    /92  LB/TON     /92    /151
   ======== ========= ==== ======= ======= =======  ======= ======= ======= ======= ====== ======   =====  ======
 1 BARNSTABLE   186605  3.1%     850     5780     1295     2549   31.79   0.077    4.05  0.067  173.40   0.422   0.506
 2 BERKSHIRE    139352  2.3%     770     5236     1173     2309   28.80   0.070    3.67  0.061  157.08   0.382   0.459
 3 BRISTOL      506325  8.4%    3339    22705     5086    10013  124.88   0.304   15.89  0.263  681.16   1.658   1.989
 4 DUKES         11639  0.2%      40      272       61      120    1.50   0.004    0.19  0.003    8.16   0.020   0.024
 5 ESSEX        670080 11.1%    2610    17748     3976     7827   97.61   0.238   12.42  0.206  532.44   1.296   1.555
 6 FRANKLIN      70092  1.2%     236     1605      359      708    8.83   0.021    1.12  0.019   48.14   0.117   0.141
 7 HAMPDEN      456310  7.6%    2691    18299     4099     8070  100.64   0.245   12.81  0.212  548.96   1.337   1.603
 8 HAMPSHIRE    146568  2.4%     333     2264      507      999   12.45   0.030    1.59  0.026   67.93   0.165   0.198
 9 MIDDLESEX   1398468 23.2%    2995    20366     4562     8981  112.01   0.273   14.26  0.236  610.98   1.488   1.784
10 NANTUCKET      6012  0.1%      67      456      102      201    2.51   0.006    0.32  0.005   13.67   0.033   0.040
11 NORFOLK      616087 10.2%    2221    15103     3383     6660   83.07   0.202   10.57  0.175  453.08   1.103   1.323
12 PLYMOUTH     435276  7.2%    1910    12988     2909     5728   71.43   0.174    9.09  0.151  389.64   0.949   1.138
13 SUFFOLK      663906 11.0%    6892    46866    10498    20668  257.76   0.628   32.81  0.543 1405.97   3.423   4.106
14 WORCESTER    709705 11.8%    2642    17966     4024     7923   98.81   0.241   12.58  0.208  538.97   1.312   1.574

   STATE       6016425 100.0%  27596   187653    42034    82755 1032.09   2.513  131.36  2.175 5629.58  13.707  16.441
                                                                                                          *6.8            *6.8
 ACTIVITY LEVEL UNITS :       ~~FIRES~~/TONS                                                    ANNUAL  ANNUAL PEAK CO PEAK CO
 ACTIVITY LEVEL PROCESS :     BURNED                 NON-ATT    COUNTY    TOWN  COUNTY  %TOWN   ACTIV EF 60LB   ACTIV    TPWD
 ACTIVITY LEVEL METHOD :                               TOWNS               POPUL   POPUL  /CNTY    TONS CO TPY   FIRES    /151
                                                                                                                 TONS
                                                     =======  ============== =======  ====== ====== ======= ======= ======
 PEAK OZ DAYS/WEEK :          7                       BOSTON    SUFF25  574283  663906   86.5%  40539 1216.17   17878   3.552
  WEEKS/YEAR :                52     PO THRUPUT : 22.4 %CAMBRIDGE MIDX21   95802 1398468    6.9%   1395   41.86     615   0.122
                                                      QUINCY    NORF23   84985  616087   13.8%   2083   62.50     919   0.183
 PEAK CO DAYS/WEEK :          7                       MEDFORD   MIDX21   57407 1398468    4.1%    836   25.08     369   0.073
  WEEKS/YEAR :                52     PC THRUPUT : 26.3%  REVERE   SUFF25   42786  663906    6.4%   3020   90.61    1332   0.265
                                                      MALDEN    MIDX21   53884 1398468    3.9%    785   23.54     346   0.069
 EMISSION FACTORS :     VOC:  11 LB/TON               CHELSEA   SUFF25   28710  663906    4.3%   2027   60.80     894   0.178
                        NOX:  1.4 LB/TON              EVERETT   MIDX21   35701 1398468    2.6%    520   15.60     229   0.046
                        CO:   60 LB/TON             SOMERVILL   MIDX21   76210 1398468    5.4%   1110   33.30     489   0.097
 EMISSION FACTOR UNITS :      LB/TON FUVOL.1 SEC.4.8.4                                 TOTAL MET.BOSTON 1569.5   23071   4.584
                                                     WORCESTER  WORC26  169759  709705   23.9%   4297  128.92    1895   0.377
 RULE EFFECTIVENESS :         N/A                    SPRINGFIE  HAMD19  156983  456310   34.4%   6295  188.86    2776   0.552
 RULE PENETRATION :           N/A                       LOWELL  MIDX21  103439 1398468    7.4%   1506   45.19     664   0.132
 SIP RULE :                   NO                       WALTHAM  MIDX21   57878 1398468    4.1%    843   25.29     372   0.074

 PO INTERVAL :                1 HR
 PC INTERVAL :                8 HR

 WEEKDAY:        86%      SAT : 7 %     SUN :     7 %

 COMMENTS:     SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT OCT-FEB (TABLE C.4 MOBILE SECTION)
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TABLE B.4-8

bbqams6b

BACKYARD CHARCOAL GRILLS VOC EMISSIONS 1990

SCC : 28-10-025-000

STATEWIDE ACTIVITY 350.76 TPY VOC SAME AS TONS CHARCOAL FOR AMS INPUT

	COUNTY ACTIVITY LEVEL : --------- COUNTIES	S.FAM HOUSING	ACTIVITY (TONS)	OZ PO ACTIV * .8	VOC TPY EM.FAC 2000lb/tn	VOC PO TPSD *.8/92	VOC PO LBSD
	========	======	=======	======	=====	======	=======
1	BARNSTABLE	8.2	28.76	23.01	28.76	0.250	500.21
2	BERKSHIRE	3.1	10.87	8.70	10.87	0.095	189.11
3	BRISTOL	7.5	26.31	21.05	26.31	0.229	457.51
4	DUKES	0.8	2.81	2.24	2.81	0.024	48.80
5	ESSEX	11.0	38.58	30.87	38.58	0.336	671.02
6	FRANKLIN	1.4	4.91	3.93	4.91	0.043	85.40
7	HAMPDEN	7.8	27.36	21.89	27.36	0.238	475.81
8	HAMPSHIRE	2.5	8.77	7.02	8.77	0.076	152.50
9	MIDDLESEX	21.8	76.47	61.17	76.47	0.665	1329.84
10	NANTUCKET	0.4	1.40	1.12	1.40	0.012	24.40
11	NORFOLK	11.1	38.93	31.15	38.93	0.339	677.12
12	PLYMOUTH	9.3	32.62	26.10	32.62	0.284	567.32
13	SUFFOLK	3.8	13.33	10.66	13.33	0.116	231.81
14	WORCESTER	11.3	39.64	31.71	39.64	0.345	689.32
	STATE	100.0	350.76	280.61	350.76	3.050	6100.17

ACTIVITY LEVEL UNITS : EMISSIONS SAME AS TONS CHARCOAL BURNED
ACTIVITY LEVEL PROCESS : 01
ACTIVITY LEVEL METHOD : CODE 232

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 80%

EMISSION FACTORS : VOC: 2000LB TAKEN FROM AEERL RESEARCH & DEVELOP
EMISSION FACTOR UNITS :510 LB/TON UNACCOUNTED FOR AREA SOURCES
EPA 600-R-92-006 JAN 1992 P.268
RULE EFFECTIVENESS : N/A NATIONAL EMISSIONS APPORTIONED TO
RULE PENETRATION : N/A BASED ON POPULATION. COUNTIES BASED
SIP RULE : NO ON SINGLE F. UNITS.

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: TOP DOWN METHOD FROM AEERL REPORT EPA 600-R-92-006 JAN 1992

TABLE B.4-9

broilams6b

COMMERCIAL CHARBROILING VOC EMISSIONS 1990

SCC : 23-02-002-000

STATEWIDE ACTIVITY 1095 CHARBROILING RESTAURANTS AS TONS OF CHARCOAL FOR AMS

	COUNTY ACTIVITY LEVEL : --------- COUNTIES	RESTAUR TOTAL	BROIL *.09	ACTIVITY (TONS)	OZ PO ACTIV *.25	VOC TPY EM.FAC 1000lb/tn	VOC PO TPSD /365	VOC PO LBSD
1	BARNSTABLE	948	85		21.33	42.66	0.117	233.75
2	BERKSHIRE	415	37		9.34	18.68	0.051	102.33
3	BRISTOL	937	84		21.08	42.17	0.116	231.04
4	DUKES	105	9		2.36	4.73	0.013	25.89
5	ESSEX	1333	120		29.99	59.99	0.164	328.68
6	FRANKLIN	135	12		3.04	6.08	0.017	33.29
7	HAMPDEN	864	78		19.44	38.88	0.107	213.04
8	HAMPSHIRE	273	25		6.14	12.29	0.034	67.32
9	MIDDLESEX	2382	214		53.60	107.19	0.294	587.34
10	NANTUCKET	76	7		1.71	3.42	0.009	18.74
11	NORFOLK	1084	98		24.39	48.78	0.134	267.29
12	PLYMOUTH	722	65		16.25	32.49	0.089	178.03
13	SUFFOLK	1655	149		37.24	74.48	0.204	408.08
14	WORCESTER	1243	112		27.97	55.94	0.153	306.49
	STATE	12172	1095		273.87	547.74	1.501	3001.32

ACTIVITY LEVEL UNITS : CHARBROIL RESTAURANTS TAKEN AS TONS CHARCOAL
ACTIVITY LEVEL PROCESS : 01
ACTIVITY LEVEL METHOD : CODE 204

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 25%

EMISSION FACTORS : VOC: 1000LB TAKEN FROM AEERL RESEARCH & DEVELOP
EMISSION FACTOR UNITS :510 LB/TON UNACCOUNTED FOR AREA SOURCES
EPA 600-R-92-006 JAN 1992 P.271

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
WEEKDAY: 1 SAT : 1 SUN : 1

COMMENTS: TOP DOWN METHOD FROM AEERL REPORT EPA 600-R-92-006 JAN 1992

TABLE B.4-10

Oct 26 93

TOTAL VOC EMISSIONS 1990 BY COUNTY FUEL COMBUSTION AND FIRES

fuelfcty3

COUNTIES	FUEL COMB TPY	FUEL COMB TPSD	FOREST FIRE TPY	FOREST FIRE TPSD	STRUCT FIRE TPY	STRUCT FIRE TPSD	BACKYARD GRILLS TPY	BACKYARD GRILLS TPSD	COMMERCIAL CHARBROIL TPY	COMMERC CHARBROIL TPSD	TOTAL FUEL COMB & FIRES VOC TPY	TOTAL FUEL COMB & FIRES VOC TPSD
=========	======	=====	=====	=====	=====	=====	========	========	==========	========	=======	=========
1 BARNSTABL	505.60	0.062	27.28	0.022	31.79	0.077	28.76	0.250	42.66	0.117	636.09	0.528
2 BERKSHIRE	377.57	0.046	37.16	0.030	28.80	0.070	10.87	0.095	18.68	0.051	473.08	0.292
3 BRISTOL	1371.86	0.167	42.15	0.034	124.88	0.304	26.31	0.229	42.17	0.116	1607.37	0.850
4 DUKES	31.54	0.004	18.78	0.015	1.50	0.004	2.81	0.024	4.73	0.013	59.36	0.060
5 ESSEX	1815.55	0.221	55.25	0.045	97.61	0.238	38.58	0.336	59.99	0.164	2066.98	1.004
6 FRANKLIN	189.91	0.023	21.28	0.017	8.83	0.021	4.91	0.043	6.08	0.017	231.01	0.121
7 HAMPDEN	1236.35	0.151	69.55	0.056	100.64	0.245	27.36	0.238	38.88	0.107	1472.78	0.797
8 HAMPSHIRE	397.12	0.048	47.13	0.038	12.45	0.030	8.77	0.076	12.29	0.034	477.76	0.226
9 MIDDLESEX	3789.09	0.462	29.04	0.023	112.01	0.273	76.47	0.665	107.19	0.294	4113.8	1.717
10 NANTUCKET	16.29	0.002	15.75	0.013	2.51	0.006	1.4	0.012	3.42	0.009	39.37	0.042
11 NORFOLK	1669.26	0.203	29.17	0.024	83.07	0.202	38.93	0.339	48.78	0.134	1869.21	0.902
12 PLYMOUTH	1179.36	0.144	30.81	0.025	71.43	0.174	32.62	0.284	32.49	0.089	1346.71	0.716
13 SUFFOLK	1798.82	0.219	0.00	0.000	257.76	0.628	13.33	0.116	74.48	0.204	2144.39	1.167
14 WORCESTER	1922.91	0.234	19.57	0.016	98.81	0.241	39.64	0.345	55.94	0.153	2136.87	0.989
STATE	16301.23	1.986	442.92	0.358	1032.09	2.513	350.760	3.052	547.78	1.502	18674.78	9.411
									Round error		18674.78	9.411

TABLE B.4-11

TOTAL NOX EMISSIONS 1990 BY COUNTY FUEL COMBUSTION AND FIRES

fuelfNOX

	COUNTIES	FUEL COMB TPY	FUEL COMB TPSD	FOREST FIRE TPY	FOREST FIRE TPSD	STRUCT FIRE TPY	STRUCT FIRE TPSD	TOTAL FUEL COMB & FIRES VOC TPY	TOTAL FUEL COMB & FIRES VOC TPSD
1	BARNSTABLE	832.59	0.997	2.11	0.002	4.05	0.010	838.75	1.009
2	BERKSHIRE	621.76	0.744	2.88	0.002	3.67	0.009	628.31	0.755
3	BRISTOL	2259.12	2.705	3.27	0.003	15.89	0.039	2278.28	2.747
4	DUKES	51.93	0.062	1.46	0.001	0.19	0.000	53.58	0.063
5	ESSEX	2989.76	3.580	4.28	0.003	12.42	0.030	3006.46	3.613
6	FRANKLIN	312.74	0.374	1.65	0.001	1.12	0.003	315.51	0.378
7	HAMPDEN	2035.96	2.438	5.39	0.004	12.81	0.031	2054.16	2.473
8	HAMPSHIRE	653.96	0.783	3.65	0.003	1.59	0.004	659.2	0.790
9	MIDDLESEX	6239.67	7.471	2.25	0.002	14.26	0.035	6256.18	7.508
10	NANTUCKET	26.82	0.032	1.22	0.001	0.32	0.001	28.36	0.034
11	NORFOLK	2748.85	3.291	2.26	0.002	10.57	0.026	2761.68	3.319
12	PLYMOUTH	1942.11	2.325	2.39	0.002	9.09	0.022	1953.59	2.349
13	SUFFOLK	2962.21	3.547	0.00	0.000	32.81	0.080	2995.02	3.627
14	WORCESTER	3166.56	3.791	1.52	0.001	12.58	0.031	3180.66	3.823
	STATE	26844.04	32.140	34.33	0.027	131.37	0.321	27009.74	32.488
								27009.74	32.488

TABLE B.4-12

TOTAL CO EMISSIONS 1990 BY COUNTY FUEL COMBUSTION AND FIRES

fuelfCO

COUNTIES	FUEL COMB TPY	FUEL COMB TPSD	FUEL COMB TPWD	FOREST FIRE TPY	FOREST FIRE TPSD	FOREST FIRE TPWD	STRUCT FIRE TPY	STRUCT FIRE TPSD	STRUCT FIRE TPWD	TOTAL FUEL COMB & FIRES CO TPY	TOTAL FUEL COMB & FIRES CO TPSD	TOTAL FUEL COMB & FIRES CO TPWD
=========	======	=====	=====	=====	=====	=====	=====	=====	=====	=======	=======	=======
1 BARNSTABLE	4063.89	1.165	21.513	164.42	0.133	0.118	173.40	0.422	0.506	4401.71	1.720	22.137
2 BERKSHIRE	3034.81	0.870	16.065	223.98	0.181	0.160	157.08	0.382	0.459	3415.87	1.433	16.684
3 BRISTOL	11026.76	3.162	58.371	254.05	0.205	0.182	681.16	1.658	1.989	11961.97	5.025	60.542
4 DUKES	253.47	0.073	1.342	113.23	0.091	0.081	8.16	0.020	0.024	374.86	0.184	1.447
5 ESSEX	14593.03	4.185	77.250	333.03	0.269	0.238	532.44	1.296	1.555	15458.5	5.750	79.043
6 FRANKLIN	1526.47	0.438	8.080	128.26	0.104	0.092	48.14	0.117	0.141	1702.87	0.659	8.313
7 HAMPDEN	9937.54	2.850	52.605	419.23	0.339	0.300	548.96	1.337	1.603	10905.73	4.526	54.508
8 HAMPSHIRE	3191.96	0.915	16.897	284.12	0.229	0.203	67.93	0.165	0.198	3544.01	1.309	17.298
9 MIDDLESEX	30455.89	8.734	161.221	175.08	0.141	0.125	610.98	1.488	1.784	31241.95	10.363	163.130
10 NANTUCKET	130.93	0.038	0.693	94.96	0.077	0.068	13.67	0.033	0.040	239.56	0.148	0.801
11 NORFOLK	13417.17	3.848	71.025	175.84	0.142	0.126	453.08	1.103	1.323	14046.09	5.093	72.474
12 PLYMOUTH	9479.46	2.718	50.180	185.73	0.150	0.133	389.64	0.949	1.138	10054.83	3.817	51.451
13 SUFFOLK	14458.57	4.146	76.538	0.00	0.000	0.000	1405.97	3.423	4.106	15864.54	7.569	80.644
14 WORCESTER	15455.98	4.432	81.818	117.99	0.095	0.084	538.97	1.312	1.574	16112.94	5.839	83.476
STATE	131025.93	37.574	693.598	2669.92	2.156	1.910	5629.58	13.705	16.440	139325.43	53.435	711.948
										139325.43	53.435	711.948

REFERENCES FOR SMALL STATIONARY SOURCE FUEL USE AND FIRES

1. Berkshire - Pioneer Resource Conservation and Development. "Wood Burning among Massachusetts Residents 1981-1982 Data." Bureau of Forest Development, Division of Forests and Parks, June 1982.

2. Berkshire - Franklin Resource Conservation and Development. "Heating with Wood in Massachusetts Households." A Fuelwood Market Report. Carolyn Harper et al. Massachusetts Division of Forests and Parks January 1980.

3. Department of Environmental Management, Forest Products Marketing and Utilization Program - Massachusetts Division of Forests and Parks. Listing of commercial users of wood and wood products as fuel. John Breed. Lancaster, Mass. January 1989.

4. Energy Information Administration. "State Energy Data Report Consumption Estimates 1960-1990." U.S. Dept. of Energy DOE/EIA-021(87) Wash. DC May 1992.

5. E.P.A. "Compilation of Air Pollutant Emission Factors, AP-42 Volume 1 Stationary Point and Area Sources. 11 OAQPS-RTP NC 4th Ed. Sept. 1985 and Supplements A to D September 1991.

6. EPA "Criteria Pollutant Emission Factors for the 1985 NAPAP Emissions Inventory" Research and Development RTP N.C. May 1987.

7. EPA "Procedures for the Preparation of Emission Inventories for Precursors of Ozone". Vol. 1 OAQPS RTP NC. EPA 450/4-91-016 May 1991.

8. Executive Office of Energy Resources "The Massachusetts Energy Path". Vol. 1 Massachusetts Energy Profile 1972-1982.

9. Executive Office of Energy Resources, Massachusetts, "The State Annual Forecast of Energy Resources (SAFER) 1987-1997 - Fueling the Future". Sharon M. Pollard. December 1987.

10. Executive Office of Energy Resources, Massachusetts, "The State Annual Forecast of Energy Resources (SAFER) 1988-2000 -Demand Update". Sharon M. Pollard. December 1988.

11. Executive Office of Energy Resources: "Developing Energy Resources: A Five Point Plan. A Report of the State Annual Forecast of Energy Resources Project". Sharon M. Pollard. December 1988.

12. Forest and Parks Division, Massachusetts Dept. of Environmental Management. Memorandum to Kenneth Santlal from David Fraser on woodburning estimated trends from 1984 to 1987. March 23, 1987. Memorandum from Doug Leab updating woodburning estimates for 1990

13. Massachusetts DEP, Division of Air Quality Control. "Stationary Source Emission Inventory System (SSEIS). Fuel use for Commercial/Industrial Facilities, 1990.

14. Satterfield, Gary. Wood Heating Alliance. Washington DC (202) 857-1181. Telephone conversation on conversion factors from cords of wood to tons. July 20, 1989.

15. U.S. Department of Agriculture, "Wood and Energy in Massachusetts". Mark Bailey et al. Natural Resource Economics Division. Washington DC. December 1982.

16. Massachusetts Division of Forest and Parks, Bureau of Fire Control, Department of Environmental Management. Annual Reports for fiscal years 1986/87, 1987/1988.

17. Massachusetts State Fire Marshall's Office, Department of Public Safety. Massachusetts Fire Incident and Reporting System. FY 1986 to 1990 Annual Reports.

18. University of Massachusetts Cooperative Extension Service, Southeast Office, Hanson, Mass. Telephone conversation with Dominic Marini. August 11, 1989.

19. Energy Information Administration, Office of Oil and Gas, U.S. Department of Energy, "Petroleum Marketing Monthly 1990" Washington DC. December 1991.

20. "1990 Census of Population and Housing." Summary Population and Housing Characteristics-Massachusetts, U.S. Department of Commerce, Bureau of Census, August 1991.

21. "County Business Patterns 1989 - Massachusetts". CPB 89-23 U.S. Department of Commerce, Bureau of Census, June 1991.

22. EPA Air and Energy Engineering Research Laboratory "Research and Development - Identification and Characterization of Missing or Unaccounted for Area Source Categories." EPA 600-R-92-006 RTP NC January 1992.

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SECTION C

ON-ROAD MOBILE SOURCE EMISSION INVENTORIES

C.1 INTRODUCTION

The DEP Mobile Source Emission Inventories for Massachusetts are an estimate of the quantity of volatile organic compounds (VOC), carbon monoxide (CO), and oxides of nitrogen (NO_x) emitted statewide from highway vehicles. Other mobile sources, such as industrial equipment, farm equipment, trains, and boats, are accounted for as part of the Non-Road Mobile Emission Inventories in Section D. This document presents the 1990 base year mobile source inventories for use in developing revisions to the State Implementation Plans (SIP's) for Ozone and Carbon Monoxide in accordance with the 1990 CAAA.

In order to estimate mobile source emissions, two major pieces of information are required: daily vehicle-miles traveled (DVMT) and emission factors (in grams of pollutant per vehicle-mile). Although a common technique for estimating DVMT is use of calibrated system-level transportation models, the 1990 DVMT values used in these inventories are based on the statewide traffic counting network and roadway link data maintained by the Massachusetts Highway Department (MHD), formerly Massachusetts Department of Public Works (MDPW).[6] Section C.3 and

Appendix C.3 explain the procedures MHD followed in developing the DVMT estimates for DEP.

Emission factors used in the inventory are calculated by MOBILE5a, the most recent version of EPA's computer model for developing mobile source emission factors, using the EPA revised December 1992 version.[5] MOBILE5a was run using the same inputs as that of MOBILE4.1. MOBILE5a accounts for a number of parameters that influence emissions from the highway vehicle fleet including: the number of vehicle miles travelled by roadway functional class on a seasonally adjusted basis; vehicle ages and types by registration for the past 25 years from 1966 to 1990; the impact of the Massachusetts Inspection and Maintenance (I/M) Program inputs; the minimum and maximum daily temperatures for summer and winter; the ambient temperature for summer and winter; and the variations in the Reid Vapor Pressure (RVP) of gasoline from the winter carbon monoxide season which runs from November through March, to the summer ozone season which runs from April through September; average speed by roadway functional class, and operating mode by the proportion of travel done by vehicles with warmed-up versus cold engines.

Section C.2 provides an explanation of MOBILE5a and its input parameters. Section C.3 and Appendix C.3 describe the VMT/Speed data collection from MHD. Section C.4 describes the emission calculations which utilize DVMT, Speeds, Mobile 5.0 emission factors and seasonal adjustment factors by vehicle class.

MOBILE5a is a computer program that estimates hydrocarbon (HC), carbon monoxide (CO), and oxides of nitrogen (NO_x) emission factors for gasoline-fueled and diesel-fueled highway motor vehicles. MOBILE5a is an integrated set of FORTRAN routines that can be broken down into 4 main sections: the Control Section; the One-Time Data Section; the Local Area Parameter (LAP) Record; and 8 Scenario Descriptive Records (User's Guide to MOBILE5a p. 1-1).

The Control Section consists of 18 flags or switches which can be manipulated in order to control the input data, the analysis of a scenario during the MOBILE5a run, and the output of the emission factors (User's Guide to MOBILE5a p. 2-1).

The One-Time Data Section contains information which is only input once in a given MOBILE5a input file. The input information is used to alter data internal to MOBILE5a to reflect locality-specific information when such information is available for use. The internal data in MOBILE5a is referred to in this document as national average data or MOBILE5a default rates. The only input Massachusetts has altered which greatly effects the resultant emission factor calculations is the Inspection and Maintenance flag (IMFLAG = 2) (User's Guide to MOBILE5a p. 2-19). The Inspection and Maintenance inputs are Program Start Year; Stringency Level; 1st Model Year; Last Model Year; Waiver Rate Pre-1981; Waiver Rate 1981 & Post 1981; Compliance Rate; Program Type; Inspection Frequency; Vehicle Types Subject to Inspection; Test Type; Alternative Credits; Transient Test; Purge System Check; and

Pressure Check (User's Guide to MOBILE5a p. 2-78 thru 2-79a). See Table C.1 and C.2 for Massachusetts specific Inspection and Maintenance inputs.

The Local Area Parameter (LAP) Record consists of 8 locality-specific input variables that must be included at least once in every MOBILE5a run. These variables are: Scenario Name; Minimum Daily Temperature; Maximum Daily Temperature; Base (Pre-Control) Reid Vapor Pressure (RVP); In-Use (Controlled) RVP; In-Use RVP Start Year; Oxygenated Fuel Sales Fraction (OPTIONAL); and Diesel Sales Fraction (OPTIONAL)(User's Guide to MOBILE5a p. 2-36, 2-37). See Table C.1 and Table C.2 for Massachusetts specific inputs.

The Scenario Descriptive Records follow the LAP Record in the MOBILE5a input stream. Only the first Scenario Descriptive Record is mandatory at this time, the other 7 Scenario Descriptive Records are described at the end of Section C.2. Record 1: Scenario Descriptive Record (Mandatory) consists of 5 variables: Region for which emission factors are calculated; Calendar year of evaluation; Average speed to be used; Ambient temperature; and Operating mode fractions (User's guide to MOBILE5a p. 2-48, 2-84). See Table C.1 and Table C.2 for Massachusetts specific inputs. Massachusetts has done scenarios for speeds starting at 2.5 miles per hour, and then for every mile per hour between 3 mph and 65 mph.

C.2-i MOBILE5a INPUT OUTLINE AND CITATION

Tables C.1 and C.2 summarize the methods and data sources used in calculating these mobile inventories.

TABLE C.1
MOBILE5a FLAGS AND INPUTS FOR BASE 1990 EMISSIONS INVENTORY

Input	Unit/Method
Tampering Rates:	National Average/MOBILE5a default rates.
VMT Mix:	MHD State mix see Appendix C.3
Annual Mileage Accumulation and/or Registration Distribution by Age	Flag switch "3" = National Registration Distribution by Average/Mobile 5.0 default rates for Annual Mileage Accumulation; Massachusetts specific Registration Distribution by Age. See Appendix C.5.
Modified Basic Exhaust Emission Rates (BERs):	National Average/MOBILE5a default BERs.
Inspection and Maintenance Program Inputs	flag switch "2" = Massachusetts program modeled.
Start Year:	1983.
Stringency Level:	12%.
1st Model Year:	analysis year minus 14.
Last Model Year:	analysis year: July 1, 1990.
Waiver Rate Pre-1981:	1%.
Waiver Rate 1981 & Post:	1%.
Compliance Rate:	80%.
Program Type:	decentralized/computerized.
Inspection Frequency:	annual.
Vehicle Types Subject to Inspection:	LDGV, LDGT1, LDGT2.
Test Type:	idle.
Alternative Credits:	none.
Transient Test:	not modelled (leave blank).
Purge System Check:	not modelled (leave blank).
Pressure Check:	not modelled (leave blank).
Exhaust Emission Correction Factors:	no corrections.

TABLE C.1
MOBILE5a FLAGS AND INPUTS
FOR BASE 1990 EMISSIONS INVENTORY (CONTINUED)

Input	Unit/Method
Anti-Tampering Program:	no ATP assumed.
Refueling Emission Factors:	flag switch "1" = uncontrolled refuelling emissions accounted in Mobile Source Inventory.
Local Area Parameter Record Inputs	flag switch "2" = one local area parameter record for all scenarios of the MOBILE5a run.
Ozone Runs	
Minimum Daily Temperature (°F):	67.5°.
Maximum Daily Temperature (°F):	94.4°.
Temperature Values:	flag switch "1" = daily average emissions.
"Period 1" Reid Vapor Pressure (RVP):	11.5 psi.
"Period 2" RVP:	8.5 psi.
"Period 2" Start Year:	1989.
Oxygenated Fuel Flag:	flag switch "1" = not applicable.
Diesel Sales Fraction:	flag switch "1" = not applicable.
Carbon Monoxide Runs	
Minimum Daily Temperature (°F):	35.4°.F
Maximum Daily Temperature (°F):	44.8°.F
Temperature Values:	flag switch "1" = daily average emissions.
"Period 1" Reid Vapor Pressure (RVP):	13.5 psi.
"Period 2" RVP:	13.5 psi.
"Period 2" Start Year:	1989.
Oxygenated Fuel Flag:	flag switch "1" = not applicable.
Diesel Sales Fraction:	flag switch "1" = not applicable.
Record 1: Scenario Descriptive Record (Mandatory)	
Region:	flag switch "1" low-altitude.
Calendar Year of Evaluation:	base year 1990.
Average Speed:	roadway class specific.

TABLE C.1
MOBILE5a FLAGS AND INPUTS FOR BASE 1990 EMISSIONS INVENTORY (CONTINUED)

Input	Unit/Method
Record 1: Scenario Descriptive Record (Mandatory)	
Ambient Temperature(°F) for	
ozone:	85.4°.
carbon monoxide:	39.5°
Operating Mode Fractions:	20.6/27.3/20.6.
Record 2: LAP Record for this Scenario only (OPTIONAL) (required only if LOCFLG = 1, not required in Massachusetts at this time. See end of Section C.2 for further explanation.)	
Record 3: Oxygenated Fuels Descriptive Record (OPTIONAL) (Not required in Massachusetts at this time. See end of Section C.2 for further explanation.)	
Records 4-8: OPTIONAL (Not required in Massachusetts at this time. See end of Section C.2 for further explanation.)	

TABLE C.2
MOBILE5a INPUT CITATION FOR BASE 1990 EMISSIONS INVENTORY

Input	Source/Citation
Tampering Rates:	EPA Guidance, Procedures for Emissions Inventory Preparation: Volume IV: Mobile Sources, (hereafter Volume IV), July 1992, p. 60.
VMT Mix:	Volume IV, p. 16 MHD See Appendix C.3
Annual Mileage Accumulation and Registration Distribution by Age:	Volume IV, p. 17 and CTPS correspondence, Appendix C.5.
Basic Exhaust Emission Rates (BERs):	Volume IV, p. 13.

TABLE C.2
MOBILE5a INPUT CITATION FOR BASE 1990 EMISSIONS INVENTORY

Input	Source/Citation
Inspection and Maintenance:	310 Code of Massachusetts Regulations (CMR) 7.20, "1990 DEP I/M Report", and Volume IV, p. 46.
Additional Exhaust Emission Correction Factors:	Volume IV, p. 42.
Anti-Tampering Program:	Volume IV, p.61
Refueling Emission Factors:	310 CMR 7.24 and Volume IV, p.44.
Local Area Parameter Record Inputs:	flag switch "2" = one local area parameter record for all scenarios of the MOBILE5a run.
Ozone Runs	
Minimum Daily Temperature (°F):	Volume IV, p. 36.
Maximum Daily Temperature (°F):	Volume IV, p. 36.
Temperature Values:	flag switch "1" = average daily emissions, Volume IV, p. 36.
"Period 1" Reid Vapor Pressure (RVP):	DEP "Background Document for 310 CMR 7.24"
"Period 2" RVP:	DEP Area Programs Implementation Branch internal technical survey Memorandum (attached Appendix C.1-4).
"Period 2" Start Year:	310 CMR 7.24
Oxygenated Fuel Flag:	flag switch "1" = not applicable, optional.
Diesel Sales Fraction:	flag switch "1" = not applicable, optional.
Carbon Monoxide Runs	
Minimum Daily Temperature (°F):	Volume IV, p. 36.
Maximum Daily Temperature (°F):	Volume IV, p. 36.
Temperature Values:	flag switch "1" = average daily emissions, Volume IV, p. 36.

TABLE C.2
MOBILE5a INPUT CITATION
FOR BASE 1990 EMISSIONS INVENTORY (CONTINUED)

Input	Source/Citation
Carbon Monoxide Runs	
"Period 1" Reid Vapor Pressure (RVP):	DEP "Background Document on 310 CMR 7.24"..
"Period 2" RVP:	DEP "Background Document on 310 CMR 7.24.
"Period 2" Start Year:	310 CMR 7.24.
Oxygenated Fuel Flag:	flag switch "1" = not applicable, optional.
Diesel Sales Fraction:	flag switch "1" = not applicable, optional.
Record 1: Scenario Descriptive Record (Mandatory)	
Region:	Volume IV, p. 14.
Calendar Year of Evaluation:	Volume IV, p. 15.
Average Speed:	MA Highway Department, Appendix c.3 and Table c.9.
Ambient Temperature (°F):	Volume IV, p. 36.
Operating Mode Fractions:	Volume IV, p. 39.

Record 2: LAP Record for this Scenario only (OPTIONAL)
(required only if LOCFLG = 1, not required in Massachusetts at this time. See end of Section C.2 for further explanation.)

Record 3: Oxygenated Fuels Descriptive Record (OPTIONAL)
(Not required in Massachusetts at this time. See end of Section C.2 for further explanation.)

Records 4-8: OPTIONAL
(Not required in Massachusetts at this time. See end of Section C.2 for further explanation.)

C.2-ii MOBILE5a INPUT DOCUMENTATION AND EMISSION FACTORS

Emission factors for motor vehicles are specific to each car model year, pollutant, and travel speed. MOBILE5a generates emission factors in grams per mile for each vehicle class and for all vehicles based on the Massachusetts specific MOBILE5a inputs for carbon monoxide (CO), volatile organic compounds (VOC), and oxides of nitrogen (NO_x) analysis. The MOBILE5a results are presented by speeds for each vehicle class and all vehicles combined by pollutant type in the computer outputs of each run (Appendix C.1 and C.2). These factors are used in the emission calculations in Section C.4 and Appendix C.4.

The Massachusetts specific MOBILE5a inputs and the major aspects of MOBILE5a that effect emission factors, as revised December 1992, are documented as follows.

Tampering Rates Flag (TAMFLG = "1"): This flag in the model provides the option of supplying tampering rates that differ from those included in the MOBILE5a code. Massachusetts, at this time, has chosen not to attempt to calculate alternative tampering rates given the high cost of compliance with the research associated with task and the minimal benefit from the results of such technical staff research as presented in page 2-6 of the Mobile 5.0 Users Guide.[5] Thus, Massachusetts has chosen the value for the flag of "1" which uses national average/ MOBILE5a default rates built into the program. The tampering rates built into MOBILE5a are the rates that should be used in all Clean Air Act (CAA) mandated development of mobile source emission inventories (User's Guide to MOBILE5a p. 4-22).

Speed Flag (SPDFLG) = "1"): This flag in the model allows several options for the modeling of speeds and trip length, primarily for the impact on running loss emission factor calculations. Massachusetts has chosen the value "1" for this flag which models one user supplied value for the roadway classification to be applied to all eight vehicle types. Massachusetts has chosen this option due to the high cost of compliance with research associated with the task of doing research on the specific speeds of each of the eight vehicle types on each of the different roadway classifications and the minimal benefit from the results of such research. (User's Guide to MOBILE5a p. 2-6).

Vehicle Miles Travelled Mix Flag by Vehicle Type (VMFLAG = "1": The setting of the VMT mix flag only affects the composite emission factor which is not used for the purpose of inventory development. Instead, Massachusetts uses the specific vehicle type emission factor for each pollutant to get an accurate estimate of vehicle pollution in grams per mile of travel. This flag determines the VMT mix (fraction of total VMT accumulated by vehicles of each of the eight types) that will be used in MOBILE5a to estimate the composite emission factor for a given scenario. At this time Massachusetts has not been able to calculate a state specific VMT mix by vehicle type and it is not likely to change this input in the future. Massachusetts has chosen the value "1" at this time for this flag which allows the use of national average/Mobile 5.0 default values (User's Guide to MOBILE5a p. 2-22). The importance of the VMT mix by vehicle type is that the percentage of travel is used to apportion the amount of travel by each vehicle type on the twelve specific roadway classes used in the Highway Performance Monitoring System (HPMS) methodology. In the future Massachusetts hopes to receive assistance from EPA and FHWA to correlate the HPMS vehicle types with the MOBILE5a vehicle types.

Registration Distribution by Age and/or Annual Mileage Accumulation (MYMRFG = "3"): This flag controls the use of annual mileage accumulation rates by age and registration distribution by age. These parameters define the composition and travel characteristics of the fleet, and so effect the resulting emission factors significantly. Massachusetts has used state specific data from 1992 for the 1990 registration distribution by vehicle age. 1992 data is considered to be representative of 1990 conditions. Massachusetts Registry of Motor Vehicles (RMV) data was compiled by the Central Transportation Planning Staff (CTPS) of the Boston Metropolitan Planning Organization (MPO) for the 1990 Emissions Inventory. Massachusetts has chosen the value "3" for this flag which allows the use of local, state specific registration distributions by vehicle class and the use of MOBILE5a default rates for the annual mileage accumulation rates (User's

Guide MOBILE5a p.2-8). The use of locality specific data to derive registration distributions by age is more appropriate for many applications, particularly where such data reflect significant differences from the national average (User's Guide to MOBILE5a p. 2-30).

Basic Exhaust Emission Rates (BERs) Flag (NEWFLG = "1"): This flag provides the option of modifying the basic exhaust emission rates by model year. Massachusetts uses the value "1" for this flag which uses MOBILE5a values because the cost of compliance for the needed research did not provide a significant benefit (User's Guide to MOBILE5a p. 2-9). No need exists for modification of the BERs in MOBILE5a in order to develop emission factors for any calendar year through 1992 inclusive, or for CO emission factors for any calendar year through 1996 inclusive (User's Guide to MOBILE5a p. 2-30).

Inspection and Maintenance Flag (IMFLAG = "2"):

This flag allows the option of having MOBILE5a include the emission benefits of an operating inspection and maintenance (I/M) program on the emission factors. Massachusetts has chosen to use the value "2" for this input since Massachusetts has implemented an I/M program since 1983. The program uses a 12% stringency rate which reflects the tailpipe emission test failure rate among pre-1981 model year passenger vehicles (DEP Vehicle Emissions Inspection and Maintenance Program Annual Report for 1990, p. 39). The earliest model year applicable to I/M in 1990 was 1976. The last model year capable of being modeled is 2020.

MOBILE5a requires I/M waiver rates for pre-1981 vehicles and for 1981/post-1981 vehicles. Previous testing in Massachusetts has shown that waiver rates for both classes of vehicles is under 1% (DEP Vehicle Emissions Inspection and Maintenance Program Annual Report for 1990, p. 42). Since this is the lowest allowable value MOBILE5a will accept, it is the value Massachusetts uses.

The program compliance rate is 80% based on the 1990 Inspection and Maintenance Report done by DEP (p. 37-38). In Massachusetts the I/M program is decentralized/computerized and is performed on an annual basis. The vehicle types subject to inspection are light duty gas vehicles (LDGV), light duty gas trucks 1 (LDGT1), and light duty gas trucks 2 (LDGT2). The test type is idle and no alternative credits are allowed other than those available in MOBILE5a. At this time the transient test, purge system check, and pressure check have not been implemented in Massachusetts and are not accounted for in the inputs to the model (User's Guide to MOBILE5a p. 2-9).

Exhaust Emission Correction Factors (ALHFLG = "1"): This flag provides the ability to have MOBILE5a adjust some exhaust emission factors to account for certain conditions: air conditioning usage, extra loading, trailer towing, and humidity. Massachusetts has chosen not to quantify these correction factors due to the high cost of compliance and the limited benefits and accuracy of such research results. Massachusetts has chosen the flag switch "1" which does not apply additional correction factors and requires no additional inputs (User's Guide to MOBILE5a p. 2-10).

Anti-Tampering Program (ATPFLG = "1"): This flag allows for the benefits of an operating anti-tampering program to be included in the emission factor calculations. Massachusetts does not have an anti-tampering program at this time, and has chosen the value "1" which does not account for an anti-tampering program (User's Guide to MOBILE5a p. 2-10).

Refueling Emission Factors (RLFLAG = "1"): This flag controls whether and how MOBILE5a models refuelling emissions (also referred to as Stage II emissions) from gasoline fueled vehicles. Massachusetts has chosen the value "1" which models refueling emissions as uncontrolled in the mobile source inventory in 1990. Massachusetts has a Stage II program which was implemented in 1991 and has a 3 year phase in period. The system efficiency is estimated to be 95% for all vehicle types. (User's Guide to MOBILE5a p. 2-11). However, benefits of this program do not appear in this 1990 Emissions Inventory, hence it was not modeled or accounted for as an implemented program.

Local Area Parameter (LAP) Record (LOCFLG = "2"): This flag controls the input by the modeler of the local area parameters (LAP) record. Massachusetts has chosen the value of "2" for this flag which allows one local area parameter record for all scenarios of the MOBILE5a run. This record contains 6 fields for

Massachusetts: Scenario Name, Minimum and Maximum Temperatures, Base (or Pre-Controlled) Reid Vapor Pressure (RVP), In-Use (or Controlled) RVP, In-Use RVP Control Start Year, and possibly flags for oxygenated fuels and diesel sales fractions which are not modeled at this time since these programs did not exist in 1990 (User's Guide to MOBILE5a p. 2-36, 2-37).

Temperature Parameters: The Mobile 5.0 input temperature for Ozone and CO were calculated from the most recent three year period. For this 1990 base year Inventory the period used for temperature determination is 1988 to 1990. Temperatures were determined from the 10 highest concentration over the last 3 years for both Ozone and CO. The Volume IV Mobile Source Guidance[4] section 4.10 was followed for temperature determination. The results and temperatures used are described in the following paragraphs and Tables C.3 through C.5.

Ozone The MOBILE5a input temperatures for a typical ozone/summer day were determined from the 10 highest monitored ozone values from 1988 to 1990. Ozone values were obtained from the DEP/DAQC Annual Air Quality Reports 1988-1990.[8] For each of the 10 highest daily one hour ozone concentrations and their dates were recorded by site and date as presented in Table C.3. The next step was to obtain the minimum and maximum temperatures for those days from the Local Climatological Data (LCD) Summary.[12] The temperatures were taken from the meteorological site located closest to the ozone site and is presented in Table C.3. The average minimum and maximum and ambient temperatures were calculated at 67.5°F., 94.40°F., and 85.4°F., respectively. These temperature parameters are presented in Table C.3.

Carbon Monoxide The MOBILE5a input temperature for a typical CO/winter day were also determined from the 10 highest monitored concentrations for the last three years 1988 to 1990. Ozone data was analyzed for the peak CO three month period from November to January for 1988 to 1990. The one-hour values were not used because there were no exceedances of the one-hour Standard even before 1988. However, the 8 hour average standard was exceeded for this period. CO monitored data was obtained from the DEP/DAQC 1988 to 1990 Annual Air Quality Reports[9] and the EPA Aerometric Information Retrieval System (AIRS).[14] In order to ensure that the 10 highest concentrations are covered because some values may occur on the same day, the 16 highest concentrations were recorded. Three reports from AIRS were used for the period 1988 to 1990: AMP 440/Maximum Values Report, AMP 350 Raw Data Report and AMP 355 Standard Report for CO exceedances.

The 16 highest non-overlapping CO concentrations and the dates and hours were recorded. Of the top ten concentrations, three sites were recorded for the same day as indicated in Table C.4. Table C.4 presents these non-overlapping sites ranked by the CO concentration together with their dates and their 8 hour period.

The next step was to obtain the 8 hourly temperatures for the 12 sites from the LCD's[12] for 1988 to 1990. Because the LCD temperatures were given in 3-hour intervals, the 8-hour temperatures had to be interpolated. For example, Lowell has a value of 9.4 ppm for the period 1600-2300 hours. The LCD had temperatures for 1600, 1900, 2200 and 100 hours. The intervening hourly temperatures were calculated for the 8-hour period 1600-2300 and are presented in the penultimate column of Table C.5. The average 8 hour temperature was calculated in the last column. The 8-hour average temperature was calculated for the 16 sites. The statewide composite average of 39.5°F. was then calculated as presented in Table C.5. The Statewide 8 hour average minimum and maximum temperature values were calculated at 35.4°F. and 44.8°F. respectively, and presented in Table C.5. These two values were used for developing the CO emissions inventory for a typical winter day.

For ozone runs the maximum value MOBILE5a will accept for a "period 1" or pre-control RVP is 11.5 pounds per square inch (psi) ("Background Document for 310 CMR 7.24"). The "period 2" or control RVP, as measured by DEP monitoring in 1990, is 8.5 psi (DEP Area Programs Implementation Branch internal memorandum, July 1992 Appendix C.2 1st page). The "period 2" start year in Massachusetts is 1989 ("Background Document for 310 CMR 7.24"). For carbon monoxide runs the RVP is the same for both periods 13.5 psi and the start year is 1989 ("Background Document for 310 CMR 7.24").

Ambient Temperature (TEMFLG "1"): This flag controls the determination of temperatures to be used in the correction of the exhaust emission factors (HC, CO, and NO_x), the hot soak and diurnal components of the evaporative HC emission factors, and the running and resting loss HC emission factors. Massachusetts prefers the selection of a value of "1" for this flag which accounts for average daily emissions and models the minimum and maximum daily temperature and ignores the ambient temperature input. The result is that the temperature corrections are weighted to reflect average emissions over a period of time (ie. one day) where the temperature range is from the minimum to maximum temperature. Thus the use of TEMFLG = 1 is recommended for daily emission inventory preparation and SIP-related modeling by the States. (User's Guide to MOBILE5a p. 2-12).

OUTPUT FLAGS

The remaining flags relate to the output of the results and do not effect the emission factors. However, Massachusetts has chosen the following output format for this report - **Output Report (OUTFMT = "4")** flag: 80-column descriptive format; **Print (PRTFLG = "4")** flag: 3 pollutants (CO, VOC, and NO_x) emission factors are listed; **Idle Emission Factors (IDFLG = "2")** flag: the idle emission factors be calculated and printed; **Non-Methane Hydrocarbon (NMHFLG = "3")** flag: for the purpose of the 1990 Base Year Emission Inventory, volatile organic compounds (VOC) are modeled in order to remain consistent with the stationary source section of the inventory; **Hydrocarbon (HCFLAG = "4")** flag: sum and components (exhaust, evaporative, refueling, running loss, and resting loss HC) be printed and a detailed evaporative breakdown in grams.[15]

Record 1: Scenario Descriptive Record (Mandatory): The first specification required in the first record of the Scenario data section is the region for which emission factors are to be calculated. Massachusetts is a low region below 5,500 feet mean sea level and the value for in the Fortran code is "1". (User's Guide to MOBILE5a p. 2-48). The calendar year of evaluation is 1990 for the base year emissions inventory.

The average speed is estimated for each roadway class by county in Massachusetts by MHD and are described in Section C.3 and presented in Table C.9.

The operating mode fractions are based on EPA's Federal Test Procedure (FTP) for the percent of vehicle miles travelled (VMT) by (1) non-catalyst vehicles in cold start mode (PCCN), (2) catalyst-equipped vehicles in hot-start mode (PCHC), and (3) catalyst-equipped vehicles in cold-start mode (PCCC) (User's Guide to MOBILE5a p. 2-85). These values for use in the 1990 Base Year Emission Inventory are 20.6/27.3/20.6. In absence of supporting data for values other than those listed for the FTP, Massachusetts believes that the values reflecting the FTP conditions are appropriate for the 1990 Base Year Emissions Inventory. This is because the values are being used for statewide coverage over the year 1990. (User's Guide to MOBILE5a p. 2-54).

Record 2: Local Area Parameter (LAP) Record for this Scenario Only (OPTIONAL): This must appear in the Scenario data section if a different LAP record is to be applied to each scenario (LOCFLG = "1"). Massachusetts has chosen LOCFLG = "2" or one LAP record for all scenarios, hence, this record is not applicable (User's Guide to MOBILE5a p. 2-85).

Record 3: Oxygenated Fuels Descriptive Record (OPTIONAL): This record is required only if the OXYFLG = "2" on the LAP record **and** the LOCFLG = "1". Oxygenated fuels effect exhaust carbon monoxide (CO) emissions. There were no oxygenated fuels in Massachusetts in 1990. Massachusetts has chosen OXYFLG = "1" (not applicable) and LOCFLG = "2" (one LAP record for all scenarios during a MOBILE5a run). If oxygenated fuels were present in 1990 in Massachusetts, MOBILE5a would have accounted for the type of fuel's market share, oxygen content of the type of fuel, and whether a RVP waiver was granted (User's Guide to MOBILE5a p. 2-62, 2-85).

Records 4, 5, and 6: Diesel Sales Fractions (OPTIONAL): These records are required only if DSFLAG = "2" on the LAP record and LOCFLG = "1". Massachusetts has chosen DSFLAG = "1" (not applicable) and LOCFLG = "2" (one LAP record for all scenarios during a MOBILE5a run). If diesel sales fractions were modeled and accounted for Massachusetts would have included three records isting the fraction of Light Duty Vehicles (LDV)/Light Duty Trucks (LDT) sales by model year that were diesel, starting with model year = calendar year of evaluation (User's Guide to MOBILE5a p. 2-64, 2-85).

Record 7: VMT Mix by Vehicle Type Record (OPTIONAL): Massachusetts has chosen the value "3" for the VMFLAG which MHD supplied VMT mix. This local MHD VMT mix was submitted in response to EPA's August 1993 comments on the On-Road Mobile Source section. Massachusetts, with the assistance of EPA Region 1 and OMS have developed the VMT fraction for each of the eight vehicle types: Light Duty Gas Vehicles (LDGV); Light Duty Gas Trucks 1 (LDGT1); Light Duty Gas Trucks 2 (LDGT2); Heavy Duty Gas Vehicles (HDGV); Light Duty Diesel Vehicles (LDDV); Light Duty Diesel Trucks (LDDT); Heavy Duty Diesel Vehicles (HDDV); and Motorcycles (MC) (User's Guide to MOBILE5a p. 2-86). MHD's Travel Activity or VMT mix and the documentation are presented in Appendix C.3. The final VMT mix by the 8 vehicle classes and road types by county are presented in Tables C.10 to C.13.

Record 8: Additional Correction Factor Record (OPTIONAL): This record is required only if the exhaust emission correction factors are accounted for by Massachusetts (ALHFLG = "2" or "3"). Massachusetts has not accounted for these exhaust emission correction factors at this time. If Massachusetts had accounted for these factors, MOBILE5a would have adjusted some exhaust emission factors to account for certain conditions such as air conditioning usage, extra loading, trailer towing, and humidity (User's Guide to MOBILE5a p. 2-10).

C.3 TRANSPORTATION DATA FROM MASSACHUSETTS HIGHWAY DEPARTMENT (MHD) AND CENTRAL TRANSPORTATION PLANNING STAFF (CTPS)

The following transportation data elements were provided by the Massachusetts Executive Office of Transportation and Construction, Department of Public Works (DPW) now known as the Massachusetts Highway Department (MHD). The transportation data package is presented in Appendix C.3 and includes the following:

i. Daily Vehicle Miles Travelled 1990 (DVMT)
ii. Projected DVMT to attainment year 1999
iii. Seasonal DVMT Variation
iv. Hourly DVMT profile
v. Vehicle Speeds
vi. VMT Mix -Travel Activity
vii. CTPS Vehicle Age Distribution (Appendix C.5)

C.3-i **DAILY VEHICLE MILES TRAVELLED (DVMT) 1990**

The DVMT for 1990 was provided by county and roadway class and stratified by urban, small urban and rural areas. All "urbanized" and "small urban" references are to functional class and reflect Highway Performance Monitoring System (HPMS) criteria. This includes roadway mileage by county, stratified by percentage of totals, and by urbanized, small urban and rural areas. The "small urban" DVMT is combined with that of "urbanized" for this inventory. The following is a description of the roadway urban and rural functional classes (UFC and RFC) for which DVMT are stratified:

Functional System	Description
UFC 1	Interstate
UFC 2	Other Freeways and Expressways
UFC 3	Other Principal Arterial
UFC 4	Minor Arterial
UFC 5	Collector
UFC 6	Local
RFC 1	Interstate
RFC 2	Other Principal Arterial
RFC 3	Minor Arterial
RFC 4	Major Collector
RFC 5	Minor Collector
RFC 6	Local

According to MHD, the methodology used for allocating DVMT to county was derived from p.43-44 of the Mobile Source Volume IV July 1989 Guidance[4], entitled "A Second Method". In this Second Method, roadway inventory data is utilized, - that is an inventory of roadway mileage by functional category, - representing both the statewide and county highway network. The underlying assumption in this method is that VMT is generally a function of total roadway mileage and that this functional relationship becomes more direct as individual types of highways within specific areas are considered.

The DVMT data was originally presented by MHD to the Federal Highway Administration by Federal-Aid Urban Areas and rural areas by roadway functional class of 1990 through their Highway Performance Monitoring System (HPMS) procedures. The DVMT allocation factor from state to county was then derived as the ratio of the county to the state roadway mileage for each category of the highway in both rural and urban areas. The following is the formula from Volume IV p.4-44 which was utilized for allocating statewide VMT to county:

Where $Fci = \frac{Mci}{Msi}$

Fci = the apportioning factor to be applied statewide VMT to estimate county VMT for roadway type i

Mci = miles of type i roadway in county, and

Msi = miles of type i roadway in the state

The documentation of the traffic counts is through the HPMS process. Specific counts will be provided by MHD upon request. The basis of DVMT data is the statistical manipulation of a limited number of counts (less than a thousand statewide). 1990 DVMT data in Appendix C.3 were summarized and presented by county and roadway functional class in Table C.6. The DVMT data was adjusted for typical summer and winter days in Tables C.7 and C.8, respectively.

C.3-ii PROJECTED DVMT TO NON-ATTAINMENT YEAR 1999

The method of forecasting DVMT was also derived from the HPMS data and the allocation from state to county was done similarly to Section C.3-i. The 1999 DVMT forecasts were projected by MHD from the 1990 base year using a regression line estimated from the HPMS historical trend for each year from 1980 to 1990. Projected DVMT to 1999 are also presented in Appendix C.3.

C.3-iii SEASONAL DVMT VARIATION

The method of deriving DVMT for the appropriate seasons: summer for ozone and winter for CO, was also derived from the procedures used in Section C.3-i. The basic assumption by MHD in Appendix C.3-27 is the same; that DVMT is a function of the road mileage and the mix of mileage by classification within each county will approximate the statewide travel as a function of the unique county mixture of functional class mileage. The seasonal variation for Summer and Winter are presented in Tables C.7 and C.8. The January total of 3,191,017 counts and the July total of 3,313,349 counts provide an average of 3,252,183 counts. The winter seasonal adjustment factor is 0.9812 (3,191,017/3,252,183). The summer seasonal adjustment factor is 1.0188 (3,313,349/3,252,183).

C.3-iv HOURLY DVMT PROFILE

The MHD method for adjusting traffic counts by day of the week, hour of the day and month are outlined in the "AASHTO Guidelines for Traffic Data Programs" 1991 and also work done by J. Buckholz "Revised Traffic Program" 1984. Average hourly weekday volumes for combined permanent stations for summer and winter are presented in Appendix C.3.

C.3-v VEHICLE SPEEDS

Vehicle speeds by county and roadway functional class were compiled by MHD staff engineers in the Speed Data Collection Unit and Traffic Engineering Speed Zone Section as part of an ongoing monitoring program. The determination of speed by county and roadway functional class were estimated from their filing records and speed data was supplemented with radar observations. The September 1993 revised speed chart, based on EPA's August 1993 Mobile source comments is presented in Table C.9 and documented in Appendix C.3. This speed chart is utilized to allocate the Mobile5a emission factors (which are calculated by speed) to DVMT by county, roadway functional class and vehicle class.

C.3-vi MHD VMT Mix - Travel Activity

VMT Mix or Travel Activity data was submitted by MHD by road type in response to EPA's August 1993 comments on the On-road Mobile source section. MHD's data was inadequate because the activity data was submitted by vehicle axel type which satisfied their HPMS submittal, but did not fall within the eight EPA vehicle types: LDGV, LDGT1 etc. The MHD VMT mix and documentation are presented in Appendix C.3.

EPA Region 1 and Office of Mobile Sources were contacted for an interpretation of MHD's VMT mix data. EPA-OMS presented a conversion table from axel type to the 8 vehicle classes as shown in Table C.10. This table was used to develop a conversion table for VMT mix by road type as shown in Table C.11. Table C.11 was then used to develop VMT mix by road and vehicle type as shown in Table C.12. Table C.12 was then used to apportion county DVMT by road and vehicle type as shown in Table C.13 for Barnstable county. The other counties VMT mix together with emission factors and emissions are developed and presented in Appendix C.1.

C.4 EMISSIONS CALCULATIONS

In order to estimate On-Road Mobile Source Emissions, the DVMT by county and functional class was seasonally adjusted for the summer by a factor of 1.0188, and for the winter by 0.9812. The seasonally adjusted DVMT was multiplied by the Mobile-5.0 emission factors (grams per DVMT). Emission factors from MOBILE 5.0 runs for NMHC (VOC), NOx, and CO (summer & winter) are included in Appendix C.2 and C.4. These emission factors are given for speeds up to 60 mph. The speed chart in Table C.9 was used for the allocation of emission factors to speeds for each county and roadway functional class. The allocation of emission factors by speed, county roadway class, and vehicle class are presented in Appendix C.1 and a sample calculation for Barnstable county for VOC is presented in Table C.14.

The initial emissions in kilograms per day were converted to tons per summer day for each roadway functional class. Emissions by county for vehicle classes for VOC, NOx, CO (summer & winter) are presented in Appendix C.1.

An example of the Mobile Source VOC calculation for a typical ozone summer day for Barnstable County for freeways and expressways (UFC-2) for LDGV is as follows:

ADVMT (UFC2) 243,000 * 1.0188 = 247,568.4 VMT * 0.8532 (LDGV mix) * ef 1.98 gm/ml (Speed-60) = 418,266.2 grams/1000 = 418.27kg * 2.2046 lb/kg = 922.02 lbs/2000 = 0.461 TPSD VOC.

The same calculation methodology was performed for the other vehicle and other road types for VOC for Barnstable County for a combined total of 9.825 TPSD. Similar calculations were repeated for other counties for a summer day for all vehicles for a total of 302.22 tons VOC statewide. The calculation methodology was repeated for all vehicles for NO_x, CO summer and CO winter and are presented in Appendix Tables C.1.1 to C.1-4.

For 1990, On-Road Mobile Sources accounted for 302.22 TPSD VOC, 386.934 TPSD NOx, 2,268.26 TPSD CO and 3,387.69 TPWD CO.

TABLE C.3

TEMPERATURE DATA FOR MOBILE4.1 FOR 10 HIGHEST OZONE DAYS FOR LAST 3 YEARS 1988, 1989 & 1990 FOR 1990 BASE YEAR EMISSIONS INVENTORY

mobtemp1

RANK	EXCEEDANCE DATE	OZONE MONITOR	OZONE VALUE	MINIMUM TEMP	MAXIMUM TEMP	NWS SITE
1	6-22-88	WARE	0.213	53	93	BRADLEY
2	7-11-88	TRURO	0.182	71	97	PROVIDENCE
3	7-08-88	NEWBURYPORT	0.180	69	94	LOGAN
4	7-16-88	WARE	0.176	60	92	BRADLEY
5	6-15-88	GLOUCESTER	0.170	75	98	LOGAN
6	8-14-88	SUDBURY	0.170	75	98	WORCESTER
7	8-04-89	WARE	0.168	70	94	BRADLEY
8	6-16-88	WARE	0.167	65	93	BRADLEY
9	7-30-88	GLOUCESTER	0.165	72	96	LOGAN
10	7-14-88	AMHERST	0.162	65	89	BRADLEY
			AVERAGE	67.5	94.4	

AMBIENT 85.4333

AMBIENT TEMP = [(2/3)*(AVG MAX TEMP - AVG MIN TEMP)] + AVG MIN TEMP
= [(2/3)*(94.4 - 67.5)] + 67.5
= 85.4333 F

TABLE C-4
THE HIGHEST 8-HOUR CO LEVELS FOR TEN UNIQUE DAYS 1988-1990

co8hrTMP
Aug 31 '93

	#	SITE ID	CITY	ADDRESS	CO MAX 8HR	HOUR	DATE	YEAR
1	1	017-0007	LOWELL	OLD CITY HALL	9.4	16-23	NOV 26	88
2	2	017-0007	LOWELL	OLD CITY HALL	9.0	02-09	JAN 25	90
3	3	025-0021	BOSTON	BREMAN ST	8.9	19-02	NOV1/2	90
4	4	013-2007	SPRINGFIELD	E.COLUMBUS	8.6	17-24	NOV 27	88
5	5	025-0038	BOSTON	POST OFFICE	8.0	12-19	DEC 21	90
6	6	027-0020	WORCESTER	FIRE STA	8.0	16-23	JAN 16	90
7	7	013-0016	SPRINGFIELD	LIBERTY ST	7.6	20-03	JAN23/4	89
7	8*6	025-0002	BOSTON	KENMORE SQ	7.4	16-23	JAN 16	90
7	9*7	013-2007	SPRINGFIELD	E.COLUMBUS	7.4	15-22	JAN 23	89
8	10	027-0020	WORCESTER	FIRE STA	7.4	19-02	JAN10/1	88
8	11*86	017-0007	LOWELL	OLD CITY HALL	7.3	15-22	JAN 16	90
9	12	017-0007	LOWELL	OLD CITY HALL	7.2	20-03	NOV03/4	90
9	13*3	017-0007	LOWELL	OLD CITY HALL	7.1	16-23	NOV 01	90
9	14*3	013-0016	SPRINGFIELD	LIBERTY ST	7.0	19-02	NOV 1/2	90
9	15*2	013-2007	SPRINGFIELD	E.COLUMBUS	7.0	08-15	JAN 25	90
10	16	013-2007	SPRINGFIELD	E.COLUMBUS	7.0	06-13	JAN 24	89

* Another site had higher levels on same day

TABLE C.5

5cotemp90

AVERAGE, MINIMUM AND MAXIMUM TEMPERATURES FOR 10 HIGHEST 8HR CO VALUES FOR 10 UNIQUE DAYS 1988-1990

CITY	AIRS ID 25-	8-HR AVG PPM	DATE	LCD STATION	TIME 00HR	TEMP %F	8-HR AVG TEMP	MIN TEMP	MAX TEMP
1			*						
LOWELL	017-0007	9.4	NOV-26-88	BOSTON	16-23				
OLD CITY HALL				LOGAN &	16	54.5			
				CONCORD	17	51.5			
				N.HAMPS	18	48.5			
					19	45.5			
					20	43.8			
					21	42.1			
					22	40.5			
					23	39.2			
					24	37.8			
					1	36.5			
2							45.70	39.2	54.5
LOWELL	017-0007	9.0	JAN-25-90	BOSTON	02-09				
OLD CITY HALL				LOGAN &	1	35.5			
				CONCORD	2	34.7			
				N.HAMPS	3	33.8			
					4	33.0			
					5	33.0			
					6	33.0			
					7	33.0			
					8	33.7			
					9	34.3			
					10	35.0			
3							33.56	33.0	35.5
BOSTON	025-0021	8.9	NOV-1/2-90	BOSTON	19-02				
BREMAN ST				LOGAN	19	53.0			
					20	52.0			
					21	51.0			
					22	50.0			
					23	49.7			
					24	49.3			
					1	49.0			
					2	49.3			
					3	49.7			
					4	50.0	50.42	49.0	53.0

```
SPRINGF 013-2007  8.6 NOV-26-88 BRADLEY 17-24
E.COLUMBUS                      INT AIR   16  55.0
                                CONN      17  50.3
                                          18  45.7
                                          19  41.0
                                          20  39.3
                                          21  37.7
                                          22  36.0
                                          23  35.3
                                          24  34.7
                                           1  34.0
 5                                                   40.00  34.7  50.3
BOSTON  025-0038  8.0 DEC-21-90 BOSTON  12-19
POST OFFICE                     LOGAN     10  42.0
                                          11  43.0
                                          12  44.0
                                          13  45.0
                                          14  44.7
                                          15  44.3
                                          16  44.0
                                          17  44.0
                                          18  44.0
                                          19  44.0
 6                            *                      44.25  44.0  45.0
WORCEST 027-0020  8.0 JAN-16-90 WORCES  16-23
CENTR ST FIRE                   AIRPORT   16  44.0
                                          17  39.7
                                          18  39.3
                                          19  39.0
                                          20  39.0
                                          21  39.0
                                          22  39.0
                                          23  38.7
                                          24  38.3
                                           1  38.0
                                                     39.71  38.7  44.0
 7
SPRINGF 013-0016  7.6 JAN23/4 88BRADLEY 20-03
LIBERTY ST                      AIRPORT   19  39.0
                                          20  35.3
                                          21  31.6
                                          22  28.0
                                          23  27.0
                                          24  26.0
                                           1  25.0
                                           2  23.7
                                           3  22.3
                                           4  21.0
                                                     27.36  22.3  35.3
 7   8*6
BOSTON  025-0002  7.4 JAN-16-90 LOGAN   16-23
KENMORE SQ                      AIRPORT  16  40.0
                                          17  40.7
                                          18  41.4
                                          19  42.0
                                          20  42.0
                                          21  42.0
                                          22  42.0
                                          23  42.0
                                          24  42.0
                                           1  42.0
                                                   41.51  40.0  42.0
 7  9*7
SPRINGF 013-2007  7.4 JAN-23-89 BRADLEY 15-22
E.COLUMBUS                      INT AIR  13  40.0
                                CONN      14  41.7
                                          15  43.3
                                          16  45.0
                                          17  43.0
                                          18  41.0
                                          19  39.0
                                          20  35.3
                                          21  31.7
                                          22  28.0
                                                   38.29  28.0  45.0
 8  10
WORCEST 027-0020  7.4 JAN10/1 88 WORCES 19-02
FIRE STA                        AIRPORT  19  12.0
                                          20  12.0
                                          21  12.0
                                          22  12.0
                                          23  11.0
                                          24  10.0
                                           1   9.0
                                           2   9.0
                                           3   9.0
                                           4   9.0
                                                   10.88   9.0  12.0
 8  11*8,6                    *
LOWELL  017-0007  7.3 JAN-16-90 BOSTON  15-22
OLD CITY HALL                   LOGAN &  15  40.5
                                CONCORD   16  40.5
                                N.HAMPS   17  40.0
                                          18  39.5
                                          19  39.0
                                          20  38.7
                                          21  38.3
                                          22  38.0
                                                   39.31  38.0  40.5
 9  12
LOWELL  017-0007  7.2 NOV3/4 90 BRADLEY 20-03
E.COLUMBUS                      INT AIR   19  63.0
                                CONN      20  61.2
                                          21  59.3
                                          22  57.5
                                          23  57.2
                                          24  56.8
                                           1  56.5
                                           2  56.0
                                           3  55.5
                                           1  55.0
                                                    57.5  55.5  61.2
 9  13*3
        017-0007  7.1 NOV 01 90 LOGAN & 16-23
OLD CITY HALL                   CONCORD   16  58.5
                                          17  54.5
                                          18  50.5
                                          19  46.5
                                          20  44.7
                                          21  42.8
                                          22  41.0
                                          23  39.7
                                          24  39.4
                                           1  40.0
 9   14*3                                         47.27  39.7 58.45
SPRINGF 013-0016  7.0 NOV1/2 90 BRADLEY 19-02
LIBERTY ST                      INT APT   19  48.0
                                          20  46.7
                                          21  45.3
                                          22  44.0
                                          23  42.0
                                          24  40.0
                                           1  38.0
                                           2  39.0
                                           3  40.0
                                           4  41.0 42.87  38.0 48.00
 9  15*2
SPRINGF 013-2007  7.0 JAN 25 90 BRADLEY 08-15
E.COLUMBUS                      INT APT    7  37.0
                                           8  37.3
                                           9  37.7
                                          10  38.0
                                          11  38.3
                                          12  38.7
                                          13  39.0
                                          14  39.0
                                          15  39.0
                                          16  39.0 38.37  37.3 39.00
 10   16
SPRINGF 013-2007  7.0 JAN 24 89 BRADLEY 06-13
E.COLUMBUS                      INT APT    4  21.0
                                           5  20.7
                                           6  20.3
                                           7  20.0
                                           8  25.3
                                           9  30.7
                                          10  36.0
                                          11  41.7
                                          12  47.4
                                          13  53.0  34.3  20.0 53.00

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                                                   AV8HR AVMIN AVMAX
                                       STATE AVG    39.5  35.4  44.8
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       * Another site had higher levels on same day
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TABLE C-6

DAILY VEHICLE MILES TRAVELLED 1990 URBAN AND RURAL ROADS BY COUNTIES IN THOUSANDS

Revised 11/13/92
4vmtur90

COUNTIES	INTER-STATE U1	FREEWY EXPRESS U2	PRINCIP ARTERY U3	MINOR COLLECT U4	MAJOR COLLECT U5	LOCAL U6	TOTAL U1-U6	INTER STATE R1	FREEWY EXPRESS R2	PRINCIP ARTERY R3	MINOR COLLECT R4	MAJOR COLLECT R5	LOCAL R6	TOTAL R1-R6	TOTAL ALL ROADS
1 BARNSTABLE	0	243	547	286	301	572	1949	0	460	536	377	98	440	1911	3860
2 BERKSHIRE	0	398	422	228	252	279	1579	825	1009	669	446	137	295	3381	4960
3 BRISTOL	2900	1487	1780	1430	969	1467	10033	0	207	70	221	40	84	622	10655
4 DUKES	0	0	0	0	0	0	0	0	0	105	73	28	26	232	232
5 ESSEX	4020	1852	2765	1865	836	1769	13107	442	110	255	217	27	121	1172	14279
6 FRANKLIN	209	54	86	88	49	76	562	614	675	473	542	116	343	2763	3325
7 HAMPDEN	2159	178	2361	1517	573	1113	7901	833	0	343	354	57	173	1760	9661
8 HAMPSHIRE	270	117	764	556	155	294	2156	128	324	502	361	75	218	1608	3764
9 MIDDLESEX	8186	3352	5663	3025	2158	3869	26253	527	166	486	244	67	183	1673	27926
10 NANTUCKET	0	0	0	0	0	0	0	0	0	0	55	14	30	99	99
11 NORFOLK	5016	1107	3652	1967	954	1959	14655	126	0	117	50	8	29	330	14985
12 PLYMOUTH	241	704	2222	1269	616	945	5997	811	628	309	410	148	329	2635	8632
13 SUFFOLK	1531	1414	1957	858	280	827	6867	0	0	0	0	0	0	0	6867
14 WORCESTER	3886	1314	3473	1460	738	1208	12079	1465	453	1520	981	205	562	5186	17265
STATE	28418	12220	25692	14549	7881	14378	103138	5771	4032	5385	4331	1020	2833	23372	126510
						103138								23372	126510

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TABLE C-7

DAILY VEHICLE MILES TRAVELLED 1990 URBAN AND RURAL ROADS BY COUNTIES IN THOUSANDS
SEASONAL ADJUSTMENT : SUMMER 1.0188

5vmtseas
dec 17 92

COUNTIES	INTER-STATE U1	FREEWY EXPRESS U2	PRINCIP ARTERY U3	MINOR COLLECT U4	MAJOR COLLECT U5	LOCAL U6	TOTAL U1-U6	INTER STATE R1	FREEWY EXPRESS R2	PRINCIP ARTERY R3	MINOR COLLECT R4	MAJOR COLLECT R5	LOCAL R6	TOTAL R1-R6	TOTAL ALL ROADS
--------	-------	-------	-------	-------	-------	-------	======	-------	-------	-------	-------	-------	-------	=======	=========
1 BARNSTABLE	0	243	547	286	301	572	1949	0	460	536	377	98	440	1911	3860
summer adj	0.0	247.6	557.3	291.4	306.7	582.8	1985.6	0.0	468.6	546.1	384.1	99.8	448.3	1946.9	3932.6
2 BERKSHIRE	0	398	422	228	252	279	1579	825	1009	669	446	137	295	3381	4960
summ adj	0.0	405.5	429.9	232.3	256.7	284.2	1608.7	840.5	1028.0	681.6	454.4	139.6	300.5	3444.6	5053.2
3 BRISTOL	2900	1487	1780	1430	969	1467	10033	0	207	70	221	40	84	622	10655
summ adj	2954.5	1515.0	1813.5	1456.9	987.2	1494.6	10221.6	0.0	210.9	71.3	225.2	40.8	85.6	633.7	10855.3
4 DUKES	0	0	0	0	0	0	0	0	0	105	73	28	26	232	232
summ adj	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.0	74.4	28.5	26.5	236.4	236.4
5 ESSEX	4020	1852	2765	1865	836	1769	13107	442	110	255	217	27	121	1172	14279
summ adj	4095.6	1886.8	2817.0	1900.1	851.7	1802.3	13353.4	450.3	112.1	259.8	221.1	27.5	123.3	1194.0	14547.4
6 FRANKLIN	209	54	86	88	49	76	562	614	675	473	542	116	343	2763	3325
summ adj	212.9	55.0	87.6	89.7	49.9	77.4	572.6	625.5	687.7	481.9	552.2	118.2	349.4	2814.9	3387.5
7 HAMPDEN	2159	178	2361	1517	573	1113	7901	833	0	343	354	57	173	1760	9661
summ adj	2199.6	181.3	2405.4	1545.5	583.8	1133.9	8049.5	848.7	0.0	349.4	360.7	58.1	176.3	1793.1	9842.6
8 HAMPSHIRE	270	117	764	556	155	294	2156	128	324	502	361	75	218	1608	3764
summ adj	275.1	119.2	778.4	566.5	157.9	299.5	2196.5	130.4	330.1	511.4	367.8	76.4	222.1	1638.2	3834.8
9 MIDDLESEX	8186	3352	5663	3025	2158	3869	26253	527	166	486	244	67	183	1673	27926
summ adj	8339.9	3415.0	5769.5	3081.9	2198.6	3941.7	26746.6	536.9	169.1	495.1	248.6	68.3	186.4	1704.5	28451.0
10 NANTUCKET	0	0	0	0	0	0	0	0	0	0	55	14	30	99	99
summ adj	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.0	14.3	30.6	100.9	100.9
11 NORFOLK	5016	1107	3652	1967	954	1959	14655	126	0	117	50	8	29	330	14985
summ adj	5110.3	1127.8	3720.7	2004.0	971.9	1995.8	14930.5	128.4	0.0	119.2	50.9	8.2	29.5	336.2	15266.7
12 PLYMOUTH	241	704	2222	1269	616	945	5997	811	628	309	410	148	329	2635	8632
summ adj	245.5	717.2	2263.8	1292.9	627.6	962.8	6109.7	826.2	639.8	314.8	417.7	150.8	335.2	2684.5	8794.3
13 SUFFOLK	1531	1414	1957	858	280	827	6867	0	0	0	0	0	0	0	6867
summ adj	1559.8	1440.6	1993.8	874.1	285.3	842.5	6996.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6996.1
14 WORCESTER	3886	1314	3473	1460	738	1208	12079	1465	453	1520	981	205	562	5186	17265
summ adj	3959.1	1338.7	3538.3	1487.4	751.9	1230.7	12306.1	1492.5	461.5	1548.6	999.4	208.9	572.6	5283.5	17589.6
STATE															

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TABLE C.8

DAILY VEHICLE MILES TRAVELLED 1990 URBAN AND RURAL ROADS BY COUNTIES IN THOUSANDS

SEASONAL ADJUSTMENT : WINTER 0.9812

5vmtseaw
dec 17 92

COUNTIES	INTER- STATE U1	FREEWY EXPRESS U2	PRINCIP ARTERY U3	MINOR COLLECT U4	MAJOR COLLECT U5	LOCAL U6	TOTAL U1-U6	INTER STATE R1	FREEWY EXPRESS R2	PRINCIP ARTERY R3	MINOR COLLECT R4	MAJOR COLLECT R5	LOCAL R6	TOTAL R1-R6	TOTAL ALL ROADS
1 BARNSTABLE	0	243	547	286	301	572	1949	0	460	536	377	98	440	1911	3860
winter adj	0.0	238.4	536.7	280.6	295.3	561.2	1912.4	0.0	451.4	525.9	369.9	96.2	431.7	1875.1	3787.4
2 BERKSHIRE	0	398	422	228	252	279	1579	825	1009	669	446	137	295	3381	4960
wint adj	0.0	390.5	414.1	223.7	247.3	273.8	1549.3	809.5	990.0	656.4	437.6	134.4	289.5	3317.4	4866.8
3 BRISTOL	2900	1487	1780	1430	969	1467	10033	0	207	70	221	40	84	622	10655
wint adj	2845.5	1459.0	1746.5	1403.1	950.8	1439.4	9844.4	0.0	203.1	68.7	216.8	39.2	82.4	610.3	10454.7
4 DUKES	0	0	0	0	0	0	0	0	0	105	73	28	26	232	232
wint adj	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	103.0	71.6	27.5	25.5	227.6	227.6
5 ESSEX	4020	1852	2765	1865	836	1769	13107	442	110	255	217	27	121	1172	14279
wint adj	3944.4	1817.2	2713.0	1829.9	820.3	1735.7	12860.6	433.7	107.9	250.2	212.9	26.5	118.7	1150.0	14010.6
6 FRANKLIN	209	54	86	88	49	76	562	614	675	473	542	116	343	2763	3325
wint adj	205.1	53.0	84.4	86.3	48.1	74.6	551.4	602.5	662.3	464.1	531.8	113.8	336.6	2711.1	3262.5
7 HAMPDEN	2159	178	2361	1517	573	1113	7901	833	0	343	354	57	173	1760	9661
wint adj	2118.4	174.7	2316.6	1488.5	562.2	1092.1	7752.5	817.3	0.0	336.6	347.3	55.9	169.7	1726.9	9479.4
8 HAMPSHIRE	270	117	764	556	155	294	2156	128	324	502	361	75	218	1608	3764
wint adj	264.9	114.8	749.6	545.5	152.1	288.5	2115.5	125.6	317.9	492.6	354.2	73.6	213.9	1577.8	3693.2
9 MIDDLESEX	8186	3352	5663	3025	2158	3869	26253	527	166	486	244	67	183	1673	27926
wint adj	8032.1	3289.0	5556.5	2968.1	2117.4	3796.3	25759.4	517.1	162.9	476.9	239.4	65.7	179.6	1641.5	27401.0
10 NANTUCKET	0	0	0	0	0	0	0	0	0	0	55	14	30	99	99
wint adj	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.0	13.7	29.4	97.1	97.1
11 NORFOLK	5016	1107	3652	1967	954	1959	14655	126	0	117	50	8	29	330	14985
wint adj	4921.7	1086.2	3583.3	1930.0	936.1	1922.2	14379.5	123.6	0.0	114.8	49.1	7.8	28.5	323.8	14703.3
12 PLYMOUTH	241	704	2222	1269	616	945	5997	811	628	309	410	148	329	2635	8632
wint adj	236.5	690.8	2180.2	1245.1	604.4	927.2	5884.3	795.8	616.2	303.2	402.3	145.2	322.8	2585.5	8469.7
13 SUFFOLK	1531	1414	1957	858	280	827	6867	0	0	0	0	0	0	0	6867
wint adj	1502.2	1387.4	1920.2	841.9	274.7	811.5	6737.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6737.9
14 WORCESTER	3886	1314	3473	1460	738	1208	12079	1465	453	1520	981	205	562	5186	17265
wint adj	3812.9	1289.3	3407.7	1432.6	724.1	1185.3	11851.9	1437.5	444.5	1491.4	962.6	201.1	551.4	5088.5	16940.4

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TABLE C.9

5speed90

1990 SPEEDS MILES PER HOUR BY COUNTY AND ROADWAY FUNCTIONAL CLASS

SEP 26 93 Revision

COUNT	INTER- STATE URBAN 1	FREEWY EXPRESS U2	PRINCIP ARTERY U3	MINOR ARTERIAL U4	COLLECT U5	LOCAL U6	INTER STATE RURAL 1	PRINCIPL ARTERY R2	MINOR ARTERY R3	MAJOR COLLECT R4	MINOR COLLECT R5	LOCAL R6
BARNS	-	60	40	35	37	27	-	50	42	40	37	23
BERKS	-	48	39	40	39	20	60	53	38	40	33	29
BRIST	59	50	42	32	33	31	-	58	40	39	34	36
DUKES	-	-	-	-	-	-	-	-	34	39	32	27
ESSEX	60	48	42	33	36	25	59	50	50	40	33	20
FRANK	58	48	36	32	34	33	58	48	44	43	35	30
HAMPD	59	44	42	39	37	24	60	-	42	37	36	29
HAMPS	59	46	35	32	28	20	59	46	43	33	39	37
MIDDL	60	54	44	44	25	28	60	42	43	39	33	34
NANTU	-	-	-	-	-	-	-	-	-	35	40	23
NORFO	60	51	39	36	32	29	60	-	52	39	39	31
PLYMO	60	60	44	40	29	28	60	58	51	48	31	27
SUFFO	57	43	34	30	31	29	-	-	-	-	-	-
WORCE	54	57	45	39	40	28	59	43	53	40	35	25

TABLE C.10

Travel Activity by Vehicle Type

HPMS Category	Mobile 5a Category
Motorcycle	MC
Passenger Car	98.64% LDGV, 1.36% LDDV
Other 2-Axle, 4-Tire Vehicles	65.71% LDGT1, 33.47% LDGT2, 0.82% LDDT
Buses	10.28% HDGV, 89.72% HDDV
Single Unit Trucks	
2-Axle, 6-Tire	87.90% HDGV, 12.10% HDDV
3-Axle	50.00% HDGV, 50.00% HDDV
4 or More Axle	50.00% HDGV, 50.00% HDDV
Single Trailer Trucks	
4 or Fewer Axle	HDDV
5-Axle	HDDV
6 or More Axle	HDDV
Multi Trailer Trucks	HDDV
5 or Fewer Axle	HDDV
6 Axle	HDDV
7 or More Axle	HDDV

TABLE C.11

```
              CONVERSION FROM MHD AXLE VEHICLES TO 8 EPA VEHICLE TYPES

mhdvmix5         1      2                  3                              4      5     6     7         8      9     10     11     12     13
             MOTOR     P. P.CARS P.CARS 2AXLE  2AXL*  2AXL*  2AXL*          2AXLE  3AXL +4AXL BUS.1028 -4AXL  -5AXL  +6AXL  -5AXL  6AXL   +7AXL ALL BUS
             CYCLE   CARS *.9864 *.0136 4TIRE 0.6571 0.3347 0.0082          6TIRE    SU    SU 2AX.879  TRAIL  TRAIL  TRAIL  MTRAI  MTRAI  MTRAIL & TRUCKS
ROAD TYPE                                 VEH                        BUSES SUTRUCK TRUCK TRUCK 3AX.5   TRUCK  TRUCK  TRUCK  TRUCK  TRUCK  TRUCK           TOTAL
==========  ====== ======                ======                      ====== ====  ====  ====  +4AX.5   ====   ====   ====   ====   ====   ====            ====  ====
             MC *1          LDGV   LDDV         LDGT1  LDGT2   LDDT                          HDGV                                             HDDV
                 1             2      3             4      5      6                             7                                                8

R1 INTERST     0.6   75.0   74.0    1.0    8.8    5.8    2.9    0.1    0.7    2.2   0.7   0.3     2.5    3.1    7.9    0.3    0.4    0.0    0.0  13.1  100.0  100.0

R2 PRIN ART    0.2   84.2   83.1    1.1   10.9    7.2    3.6    0.1    0.4    1.9   0.4   0.1     2.0    0.6    1.2    0.0    0.0    0.0    0.1   2.7  100.0  100.0

R3 MIN ART     0.6   84.8   83.6    1.2   11.3    7.4    3.8    0.1    0.2    1.1   0.4   0.1     1.2    0.5    0.8    0.1    0.0    0.0    0.1   2.1  100.0  100.0

R4 MAJ COLL    0.5   75.5   74.5    1.0   19.3   12.7    6.5    0.2    0.8    1.8   0.7   0.0     2.0    0.5    0.9    0.0    0.0    0.0    0.0   2.7  100.0  100.0

R5 MIN COLL    2.4   78.0   76.9    1.1   14.6    9.6    4.9    0.1    0.0    0.0   2.5   2.5     2.5    0.0    0.0    0.0    0.0    0.0    0.0   2.5  100.0  100.0

R6 RUR LOCAL   2.4   78.0   76.9    1.1   14.6    9.6    4.9    0.1    0.0    0.0   2.5   2.5     2.5    0.0    0.0    0.0    0.0    0.0    0.0   2.5  100.0  100.0

U1 INTERST     0.6   81.1   80.0    1.1   10.8    7.1    3.6    0.1    0.4    1.6   0.6   0.1     1.8    1.4    3.2    0.1    0.1    0.0    0.0   5.7  100.0  100.0

U2 FREE&EXP    0.4   86.5   85.3    1.2    8.9    5.8    3.0    0.1    0.3    1.4   0.4   0.0     1.5    0.7    1.3    0.1    0.0    0.0    0.0   2.7  100.0  100.0

U3 PRIN ART    0.5   86.6   85.4    1.2    9.5    6.2    3.2    0.1    0.3    1.0   0.6   0.2     1.3    0.5    0.7    0.1    0.0    0.0    0.0   2.1  100.0  100.0

U4 MIN ART     0.4   85.3   84.1    1.2   11.5    7.6    3.8    0.1    0.5    1.1   0.5   0.1     1.3    0.3    0.2    0.1    0.0    0.0    0.0   1.5  100.0  100.0

U5 URB COLL    0.5   85.7   84.5    1.2   11.6    7.6    3.9    0.1    0.3    0.7   0.7   0.0     1.0    0.2    0.3    0.0    0.0    0.0    0.0   1.2  100.0  100.0

U6 URB LOCAL   0.5   85.7   84.5    1.2   11.6    7.6    3.9    0.1    0.3    0.7   0.7   0.0     1.0    0.2    0.3    0.0    0.0    0.0    0.0   1.2  100.0  100.0
```

TABLE C.12

VEHICLE MIX BY EIGHT EPA VEHICLE TYPES 1990
DERIVED FROM MHD TRAVEL ACTIVITY BY 13 AXLE TYPES

5vehmix90 sep29/93

ROAD TYPE	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	ALL VEH
URBAN									
U1 INTERST	80.00	7.1	3.61	1.80	1.10	0.09	5.70	0.6	100.00
U2 FREE&EXP	85.32	5.85	2.98	1.46	1.18	0.07	2.74	0.4	100.00
U3 PRIN ART	85.42	6.24	3.18	1.31	1.18	0.08	2.09	0.5	100.00
U4 MIN ART	84.14	7.56	3.85	1.32	1.16	0.09	1.48	0.4	100.00
U5 URB COLL	84.53	7.62	3.88	1.00	1.17	0.10	1.20	0.5	100.00
U6 URB LOCAL	84.53	7.62	3.88	1.00	1.17	0.10	1.20	0.5	100.00
RURAL									
R1 INTERST	73.98	5.78	2.95	2.51	1.02	0.07	13.09	0.6	100.00
R2 PRIN ART	83.05	7.16	3.65	1.96	1.15	0.09	2.74	0.2	100.00
R3 MIN ART	83.65	7.43	3.78	1.24	1.15	0.09	2.06	0.6	100.00
R4 MAJ COLL	74.47	12.68	6.46	2.01	1.03	0.16	2.69	0.5	100.00
R5 MIN COLL	76.94	9.59	4.89	2.50	1.06	0.12	2.50	2.4	100.00
R6 RUR LOCAL	76.94	9.59	4.89	2.50	1.06	0.12	2.50	2.4	100.00

TABLE C.13

DAILY VEHICLE MILES TRAVELLED 1990 URBAN AND RURAL ROADS BY COUNTIES IN THOUSANDS
SEASONAL ADJUSTMENT : SUMMER 1.0188 APPORTIONED TO VEHICLE TYPE

5vmixBARN 9/30/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	TOTAL R1-R6	TOTAL ALL ROADS
1 BARN ADVMT	0	243	547	286	301	572	1949	0	460	536	377	98	440	1911	3860
Summer*1.0188	0.000	247.568	557.284	291.377	306.659	582.754	1985.641	0.000	468.648	546.077	384.088	99.842	448.272	1946.927	3932.568
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94		
	0.000	211.225	476.032	245.164	259.219	492.602	1684.242	0.000	389.212	456.793	286.030	76.819	344.900	1553.755	3237.996
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59		
	0.000	14.483	34.774	22.028	23.367	44.406	139.059	0.000	33.555	40.574	48.702	9.575	42.989	175.395	314.454
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89		
	0.000	7.378	17.722	11.218	11.898	22.611	70.826	0.000	17.106	20.642	24.812	4.882	21.921	89.362	160.189
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50		
	0.000	3.614	7.300	3.846	3.067	5.828	23.655	0.000	9.186	6.771	7.720	2.496	11.207	37.380	61.035
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06		
	0.000	2.921	6.576	3.380	3.588	6.818	23.283	0.000	5.389	6.280	3.956	1.058	4.752	21.435	44.719
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12		
	0.000	0.173	0.446	0.262	0.307	0.583	1.771	0.000	0.422	0.491	0.615	0.120	0.538	2.186	3.956
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50		
	0.00	6.78	11.65	4.31	3.68	6.99	33.416	0.00	12.84	11.25	10.33	2.50	11.21	48.125	81.541
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40		
	0.00	0.99	2.79	1.17	1.53	2.91	9.389	0.00	0.94	3.28	1.92	2.40	10.76	19.289	28.678
															3932.568

TABLE C.14

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC BARNSTABLE COUNTY *

5m5emBARN 10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	TOTAL R1-R6	TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 BARN ADVMT	0	243	547	286	301	572	1949	0	460	536	377	98	440	1911	3860	
Summer*1.0188	0.000	247.568	557.284	291.377	306.659	582.754	1985.641	0.000	468.65	546.077	384.088	99.842	448.272	1946.927	3932.568	
SPEED	NA	60	40	35	37	27		NA	50	42	40	37	23			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	211.225	476.032	245.164	259.219	492.602	1684.242	0.000	389.212	456.793	286.030	76.819	344.900	1553.755	3237.996	
EM.FAC G/ML	0	1.98	1.99	2.16	2.09	2.53		0	1.78	1.94	1.99	2.09	2.79			
EMISS TPSD	0.000	0.461	1.044	0.584	0.597	1.374		0.000	0.764	0.977	0.627	0.177	1.061			7.666
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	14.483	34.774	22.028	23.367	44.406	139.059	0.000	33.555	40.574	48.702	9.575	42.989	175.395	314.454	
EM.FAC G/ML	0	2.31	2.19	2.34	2.27	2.68		0	2.02	2.14	2.19	2.27	2.93			
EMISS TPSD	0.000	0.037	0.084	0.057	0.058	0.131		0.000	0.075	0.096	0.118	0.024	0.139			0.818
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	7.378	17.722	11.218	11.898	22.611	70.826	0.000	17.106	20.642	24.812	4.882	21.921	89.362	160.189	
EM.FAC G/ML	0	2.57	2.45	2.62	2.55	3.03		0	2.24	2.4	2.45	2.55	3.32			
EMISS TPSD	0.000	0.021	0.048	0.032	0.033	0.076	0.000	0.000	0.042	0.055	0.067	0.014	0.080			0.468
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	3.614	7.300	3.846	3.067	5.828	23.655	0.000	9.186	6.771	7.720	2.496	11.207	37.380	61.035	
EM.FAC G/ML	0	4.19	4.83	5.22	5.05	6.21		0	4.38	4.72	4.83	5.05	6.99			
EMISS TPSD	0.000	0.017	0.039	0.022	0.017	0.040		0.000	0.044	0.035	0.041	0.014	0.086			0.356
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	2.921	6.576	3.380	3.588	6.818	23.283	0.000	5.389	6.280	3.956	1.058	4.752	21.435	44.719	
EM.FAC G/ML	0	0.3	0.37	0.42	0.4	0.52		0	0.32	0.36	0.37	0.4	0.59			
EMISS TPSD	0.000	0.001	0.003	0.002	0.002	0.004		0.000	0.002	0.002	0.002	0.000	0.003			0.020
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.173	0.446	0.262	0.307	0.583	1.771	0.000	0.422	0.491	0.615	0.120	0.538	2.186	3.956	
EM.FAC G/ML	0	0.42	0.53	0.59	0.56	0.73		0	0.45	0.51	0.53	0.56	0.84			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.003
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	6.78	11.65	4.31	3.68	6.99	33.416	0.00	12.84	11.25	10.33	2.50	11.21	48.125	81.541	
EM.FAC G/ML	0	1.27	1.59	1.77	1.69	2.21		0	1.36	1.53	1.59	1.69	2.52			
EMISS TPSD	0.000	0.009	0.020	0.008	0.007	0.017		0.000	0.019	0.019	0.018	0.005	0.031			0.154
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	0.99	2.79	1.17	1.53	2.91	9.389	0.00	0.94	3.28	1.92	2.40	10.76	19.289	28.678	
EM.FAC G/ML	0.00	10.82	10.28	10.49	10.39	11.00		0.00	10.12	10.22	10.28	10.39	11.35			
EMISS TPSD	0.000	0.012	0.032	0.013	0.018	0.035		0.000	0.010	0.037	0.022	0.027	0.135			0.341
												COUNTY TOTAL			3932.568	9.825

* SEE APPENDIX C.1 FOR OTHER COUNTIES AND POLLUTANTS

TABLE C.15

ON-ROAD MOBILE5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -VOC
TONS PER SUMMER DAY

5vocmobct
nov 5 93

		1	2	3	4	5	6	7	8	
	COUNTIES	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC	TOTAL
	=========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	7.666	0.818	0.468	0.356	0.020	0.003	0.154	0.341	9.826
2	BERKSHIRE	9.150	0.952	0.543	0.471	0.023	0.003	0.322	0.367	11.831
3	BRISTOL	20.382	1.944	1.107	0.812	0.051	0.006	0.500	0.650	25.452
4	DUKES	0.452	0.059	0.034	0.025	0.001	0.000	0.011	0.027	0.609
5	ESSEX	27.588	2.613	1.490	1.129	0.069	0.008	0.756	0.895	34.548
6	FRANKLIN	5.787	0.668	0.380	0.342	0.015	0.002	0.239	0.289	7.722
7	HAMPDEN	18.464	1.798	1.026	0.786	0.046	0.005	0.559	0.645	23.329
8	HAMPSHIRE	7.529	0.776	0.444	0.337	0.020	0.002	0.182	0.280	9.570
9	MIDDLESEX	53.199	5.044	2.874	2.116	0.132	0.015	1.400	1.745	66.525
10	NANTUCKET	0.196	0.031	0.018	0.014	0.001	0.000	0.006	0.016	0.282
11	NORFOLK	28.94	2.719	1.548	1.139	0.072	0.008	0.76	0.927	36.113
12	PLYMOUTH	16.375	1.600	0.913	0.710	0.041	0.005	0.434	0.592	20.670
13	SUFFOLK	13.351	1.207	0.689	0.537	0.036	0.004	0.334	0.397	16.555
14	WORCESTER	30.620	3.065	1.743	1.439	0.077	0.009	1.024	1.212	39.189
	STATE qc	239.699	23.294	13.277	10.213	0.604	0.070	6.681	8.383	302.221 302.221

TABLE c.16

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -NOX
TONS PER SUMMER DAY

5noxmobct
Oct 18 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	==========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	6.161	0.702	0.380	0.435	0.074	0.008	1.678	0.030	9.468
2	BERKSHIRE	8.480	0.927	0.503	0.679	0.102	0.010	5.257	0.037	15.995
3	BRISTOL	19.102	1.941	1.054	1.179	0.227	0.020	7.812	0.070	31.405
4	DUKES	0.338	0.049	0.026	0.029	0.004	0.001	0.104	0.002	0.553
5	ESSEX	25.714	2.592	1.407	1.633	0.312	0.028	12.413	0.096	44.195
6	FRANKLIN	5.479	0.658	0.358	0.500	0.066	0.007	3.837	0.029	10.934
7	HAMPDEN	17.044	1.768	0.959	1.137	0.204	0.019	9.258	0.069	30.458
8	HAMPSHIRE	6.011	0.669	0.363	0.431	0.072	0.007	2.286	0.027	9.866
9	MIDDLESEX	51.904	5.188	2.817	3.174	0.628	0.056	23.836	0.193	87.796
10	NANTUCKET	0.136	0.024	0.013	0.015	0.002	0.000	0.050	0.001	0.241
11	NORFOLK	27.684	2.780	1.509	1.679	0.329	0.029	12.679	0.103	46.792
12	PLYMOUTH	15.257	1.567	0.851	1.023	0.184	0.017	6.998	0.060	25.957
13	SUFFOLK	11.623	1.117	0.606	0.717	0.138	0.012	4.421	0.040	18.674
14	WORCESTER	30.585	3.199	1.736	2.155	0.366	0.034	16.395	0.130	54.600
	STATE qc	225.518	23.181	12.582	14.786	2.708	0.248	107.024	0.887	386.934

TABLE 6-17

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -CO
TONS PER SUMMER DAY

5coSmobct
Oct 19 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
1	BARNSTABLE	52.808	5.929	3.314	3.289	0.046	0.005	0.650	0.575	66.616
2	BERKSHIRE	66.674	7.293	4.062	4.678	0.055	0.005	1.530	0.585	84.882
3	BRISTOL	154.047	15.901	8.852	8.083	0.120	0.011	2.324	1.032	190.370
4	DUKES	2.974	0.409	0.229	0.216	0.003	0.000	0.045	0.043	3.919
5	ESSEX	217.735	22.456	12.494	11.553	0.165	0.015	3.610	1.557	269.585
6	FRANKLIN	41.778	5.035	2.798	3.306	0.034	0.004	1.116	0.434	54.505
7	HAMPDEN	141.965	14.856	8.281	7.916	0.109	0.010	2.671	1.062	176.870
8	HAMPSHIRE	52.167	5.703	3.190	3.062	0.045	0.004	0.792	0.419	65.382
9	MIDDLESEX	423.184	43.615	24.251	22.076	0.320	0.028	6.774	2.968	523.216
10	NANTUCKET	1.305	0.219	0.123	0.129	0.001	0.000	0.023	0.029	1.829
11	NORFOLK	232.533	23.883	13.302	11.716	0.170	0.015	3.645	1.611	286.875
12	PLYMOUTH	125.418	12.958	7.214	7.121	0.097	0.009	2.054	0.956	155.827
13	SUFFOLK	95.330	9.039	5.006	5.061	0.081	0.007	1.469	0.595	116.588
14	WORCESTER	215.623	22.679	12.583	14.244	0.183	0.017	4.770	1.699	271.798
	STATE	1823.541	189.975	105.699	102.450	1.429	0.130	31.473	13.565	2268.262

TABLE c.18

6COWmobct
Oct 20 93

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -CO
TONS PER WINTER DAY

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	=========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	81.497	8.572	4.723	3.158	0.044	0.004	0.634	0.656	99.288
2	BERKSHIRE	103.094	10.551	5.804	4.489	0.052	0.005	1.490	0.667	126.152
3	BRISTOL	237.901	22.911	12.638	7.761	0.114	0.010	2.262	1.178	284.775
4	DUKES	4.591	0.592	0.327	0.207	0.003	0.000	0.043	0.049	5.812
5	ESSEX	335.751	32.392	17.817	11.093	0.157	0.014	3.517	1.773	402.514
6	FRANKLIN	64.762	7.304	4.006	3.176	0.032	0.003	1.088	0.496	80.867
7	HAMPDEN	219.073	21.479	11.819	7.601	0.104	0.010	2.601	1.211	263.898
8	HAMPSHIRE	80.725	8.269	4.558	2.990	0.043	0.004	0.773	0.481	97.843
9	MIDDLESEX	652.770	62.961	34.593	21.200	0.305	0.027	6.600	3.386	781.842
10	NANTUCKET	2.006	0.316	0.175	0.124	0.001	0.000	0.023	0.033	2.678
11	NORFOLK	358.589	34.496	18.977	11.250	0.162	0.014	3.552	1.839	428.879
12	PLYMOUTH	193.801	18.730	10.298	6.838	0.092	0.008	2.001	1.090	232.858
13	SUFFOLK	147.195	13.073	7.196	4.856	0.077	0.006	1.430	0.679	174.512
14	WORCESTER	334.424	32.882	18.011	13.679	0.174	0.016	4.645	1.939	405.770
	STATE qc	2816.179	274.528	150.942	98.422	1.360	0.121	30.659	15.477	3387.688 3387.688

C.49

REFERENCES FOR MOBILE SOURCES

1. Massachusetts Central Transportation Planning Staff. Memoranda on Vehicle Age Distribution, September 22 1993 Appendix C.5.

2. EPA "Emission Inventory Requirements for Post-1987 Carbon Monoxide State Implementation Plans." 450/4-91-011, OAQPS RTP.NC., March 1991.

3. EPA "Emissions Inventory Requirements for Post-1987 Ozone State Implementation Plans." OAQPS RTP.NC. 450/4-88-019. December 1988.

4. EPA "Interim Guidance for Procedures for Emission Inventory Preparation" Volume IV: Mobile Sources. Technical Support Div., OAQPS RTP, NC, and Emission Control Technology Div. Office of Mobile Sources, Ann Arbor, Michigan 450/4-81-02 6d July 1989 and February 1992.

5. EPA Users Guide to Mobile-4.1 (Mobile Source Emission Factor Model). Office of Mobile Sources, Emission Control Technology Division, Test and Evaluation Branch, Ann Arbor, Michigan. EPA-AA-TEB-89-01. February 1989 and Draft Public Release of the Mobile 4.1 Emission Factor Model (Phil Lorang), July 26, 1991. "Mobile5.0 revised December 1992, MOBILE5a June 1993.

6. Massachusetts Highway Department (MHD), Massachusetts Department of Public Works (DPW) Bureau of Transportation Planning & Development (BTP&D) 1990 Traffic Volumes for the Commonwealth of Massachusetts.

7. Massachusetts DEP 1982 State Implementation Plan For Ozone and Carbon Monoxide. Division of Air Quality Control, and Appendix, August 1982.

8. Massachusetts DEP Annual Air Quality Reports 1988-1990, Division of Air Quality Control.

9. Massachusetts DEP, Division of Air Quality Control, Inspection and Maintenance Program (I/M) 1990.

10. Massachusetts DEP, Division of Air Quality Control, internal memorandum on RVP survey test results 1990. Appendix C.1-4

11. Massachusetts Institute for Social and Economic Research (MISER) University of Mass, Amherst, Massachusetts. 1986 Population and 1995 Projections and 1985 per Capita Income Estimates, March 1988.

12. State Data Center. National Climatic Data Center "Local Climatological Data (LCD), Monthly Summary for Logan, Worcester (Mass), Bradley (Conn.) and Providence (RI)." 1988 to 1990. U.S. Department of Commerce, Washington D.C.

13. Polk, R.L., "Passenger Car Registration Counts by Make and Year Model." Statistical Services Division. Annual Reports 1990 - Massachusetts.

14. Aerometric Information Retrieval System (AIRS) Air Quality Data Base EPA NADB RTP N.C.

15. Mobile Source Workshop Handout, November 13 & 14, 1991. Presented by EPA Office of Mobile Sources, Ann Arbor Michigan and EPA Region I. Boston, MA

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SECTION D

NON-ROAD MOBILE SOURCES

D.1 AIRCRAFT
D.2 RAIL
D.3 VESSELS
D.4 OFF -HIGHWAY VEHICLES
(EPA NON-ROAD STUDY EMISSIONS)

D. NON HIGHWAY MOBILE SOURCES

D.1 AIRCRAFT

Aircraft can be categorized as civil or military. Civil aircraft, according to Volume IV Section 5,[3] includes all categories of fixed and rotary wing craft from the smallest single engine, privately owned and operated airplanes, to the largest multi-turbine commercial aircraft. Military aircraft are those airplanes and helicopters operated by the military organizations.

Pollutants are emitted from aircraft whenever the engines are operating. For this inventory, concern is limited to those portions of the flight that occur between ground level and an altitude defined by EPA as the above ground level inversion height. This is defined as below 3,000 feet above ground level throughout Massachusetts. Emission factors for the different types of aircraft cover operations below this inversion altitude. The activity factor is the Landing and Takeoff (LTO) cycle in which emissions are generated for five operating modes within the inversion altitude: taxi/idle out, takeoff, climb out, approach and taxi/idle into the parking area.

The methodology for estimating aircraft emissions involves the application of emission rates that reflect a generalized Time In Mode (TIM) scenario for each LTO cycle for each type of aircraft at a particular airport. The first step is to identify all airports, including private, public, and military. An FAA Sectional chart[13] was used to locate these airports. According to Volume IV,[3] private airstrips typically do not warrant consideration, owing to the relatively few LTO's and emissions associated with the operation of the light airplanes that use these fields. Although we have included these airports in our spreadsheet Table D.1-1 and D.1-2 to assure completeness, no data (ND) was available for most of these fields.

The next step is to determine the number of LTO cycles by aircraft type for each airport for 1990. For commercial aircraft, this information is obtained from the Federal Aviation Administration "Airport Activity Statistics of Certified Route Carriers", Table 7[1]. Information is given on the number of operations (landing plus take-off) which represents one LTO cycle.

General or non-commercial aviation activity was obtained from the FAA Air Traffic Activity, Table 4[4] which includes civil and military operations in those airports which have FAA-operated control towers. Although data for many other smaller and private airports may be missing, operations from these airports were obtained from the Massachusetts Aeronautics Commission, Airport System Plan (MASP)[5] and historical usage reports[14], which supplemented the data from Reference 5. Wherever both reports had data for the same airport, the one with the higher number of operations was used.

Emission factors from the Federal Aircraft Emissions Estimation Database (FAEED) Model and the Department of the Air Force, "Aircraft Engine Emissions Estimator"[9] were also applied to the military aviation activities (LTO's). An emission factor from the most similar engine/aircraft combination was used when the FAEED Model did not have emission factors for a particular engine/aircraft combination.

Military activities were estimated using data on the operation at the Air National Guard (ANG) base at Barnes Municipal Airport, Westfield and Westover Air Reserve Base, Chicopee, Hampden County, and at Otis Air National Guard base at Mashpee, Barnstable County, Massachusetts. An emission factor for the A-10 Thunderbolt II was obtained from the US Air Force "Aircraft Engines Emissions Estimator"[9]. Detailed information on the activities at Westover Air Reserve Base were obtained from the correspondence with Mr. R. C. Martin, Jr.[10] of Spectrum Science and Software, Inc. concerning the "Draft Supplemental Environmental Impact Statement for the Air Reserve Base at Westover"[11]. Emission factors for the F-15 Eagle were obtained from the Air Force documentation. The number of LTO's at each base was obtained from the U.S. Air Force or the Air National Guard. We did not obtain activity estimate for the military operations at the South Weymouth Naval Air Station, Plymouth County. The available data was used to estimate the amount of VOC's, CO and Nox released in these counties.

The overwhelming majority of the Landings and Take Offs and emissions are concentrated at Logan Airport in Suffolk County (Boston). Emission estimates from the (appendix D-2) "Final Generic Environmental Report, Boston-Logan International Airport"[12] was used in our spread sheet. Massport's estimates were chosen because they developed a far more detailed inventory of aircraft activities and engine/airframe combinations than was available to us from the FAA reports[1,4]. Aircraft Emissions are presented in Tables D.1-2 and D.1-3.

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TABLE D.1-1

Operations and LTO's at Massachusetts Aeronautical Commission Airports

BARNSTABLE	Barnstable (Hyannis)			Itinerant			Local		Instrument	
			Cargo + AT	Gen Avia	Military	Local GA	Local Mil	AT Inst	Civillian	Military
		Jan	3700	3700	36	1866	68	1028	385	11
		Feb	2891	2726	21	1210	54	1289	522	52
		Mar	3614	4083	17	2714	96	1652	1773	3
		Apr	4014	4414	23	2494	66	2131	1066	14
		May	4700	5187	40	2850	80	2659	1559	8
		Jun	4772	5300	27	2594	26	3267	1923	10
		Jul	5514	5608	24	2664	44	2319	1381	23
		Aug	6191	7230	25	3848	32			
		Sep	4905	5264	28	2446	30	1563	841	18
		Oct	4449	4359	10	2186	46	1233	679	17
		Nov	4076	3746	76	1842	180	1071	402	13
		Dec	3365	3103	21	1567	64	1424	565	37
			52191	54720	348	28281	786	19636	11096	206

BARNSTABLE	Barnstable (Hyannis)	LTO's		
			Commercial	35914
			Gen. Ava.	47049
			Military	670

DUKES	Martha's Vinyard			Itinerant			Local		Instrument	
			Cargo + AT	Gen Avia	Military	Local GA	Local Mil	Civillian	Military	AT Inst
		Jan	1509	9779	102	11390	0	1809	190	310
		Feb	1552	7788	97	9437	0	1612	64	275
		Mar	1700	11355	157	13300	2	2150	131	310
		Apr	1655	10555	196	12406	0	2442	113	244
		May	1946	12866	183	14995	34	2678	111	317
		Jun	1966	12837	229	15032	8	2837	150	335
		Jul	1836	13015	164	15015	0	2756	108	348
		Aug	1863	13350	192	15405	8	2926	17	286
		Sep	1626	12941	178	14745	0	2566	114	272
		Oct	1819	11151	196	13170	6	2594	151	399
		Nov	1845	9794	168	11807	8	1925	126	228
		Dec	1818	7709	130	9157	0	1731	96	201
			21135	133140	1992	155859	66	26295	1371	3525

Operations and LTO's at Massachusetts Aeronautical Commission Airports

DUKES	Martha's Vinyard	LTO's	Commercial	12330
			Gen. Ava.	157647
			Military	1715

ESSEX Beverly

		Itinerant			Local		Instrument	
	Cargo + AT	Gen Avia	Military	Local GA	Local Mil	Civillian	Military	AT Inst
Jan	0	3472	14	5615	0	441	4	0
Feb	2	2844	4	4262	0	401	0	0
Mar	0	4286	22	7461	12	480	0	0
Apr	9	3865	12	6470	0	543	1	0
May	12	4224	7	5138	2	564	0	0
Jun	9	4586	23	6157	18	623	4	5
Jul	14	5198	24	5694	18	716	0	4
Aug	8	5882	49	7344	20	675	8	2
Sep	4	4630	39	7177	12	490	0	0
Oct	0	4288	7	8174	0	433	0	0
Nov	1	4098	18	8250	10	362	0	0
Dec	0	3466	22	6046	18	338	0	0
Total Ops	59	50839	241	77788	110	6066	17	11

ESSEX	Beverly	LTO's	Commercial	35
			Gen. Ava.	67347
			Military	184

HAMPDEN Westfield Barns AGB

		Itinerent				Local		Instrument
	Transport	AT Inst	Itin GA	Military	Local GA	Local Mil	Civillian	Military
Jan	0	2	4316	966	3923	304	950	229
Feb	1	1	3198	817	2788	384	747	224
Mar	1	0	5159	1169	5703	520	1070	226
Apr	2	0	4547	832	3905	346	1180	255
May	13	2	4997	1341	4412	824	1186	214
Jun	2	1	5881	979	5106	435	1346	148
Jul	12	7	5960	836	6342	380	1360	179
Aug	13	8	5470	813	4290	[illegible]	[illegible]	[illegible]

Operations and LTO's at Massachusetts Aeronautical Commission Airports

	Sep	3	1	5600	938	4791	382	1145	216
	Oct	4	3	5032	1005	3980	426	968	175
	Nov	16	13	4974	1009	4476	596	968	134
	Dec	13	11	4119	812	3906	510	842	201
Total Operation		80	49	59253	11517	53622	5500	13148	2447

HAMPDEN	Westfield Barns AGB	LTO's	Commercial	65
			Gen. Ava.	63012
			Military	9732

				Itinerant			Local		Instrument	
			Cargo + AT	Gen Avia	Military	Local GA	Local Mil	Civillian	Military	AT Inst
MIDDLESEX	Bedford Hanscomb AFB	Jan	1225	1278	1	610	34	171	7	513
		Feb	900	1141	33	338	26	112	6	301
		Mar	992	1543	17	710	26	281	17	406
		Apr	1104	1801	42	749	16	380	17	569
		May	1795	3176	33	1225	40	609	17	915
		Jun	1903	3572	27	824	46	1228	16	1230
		Jul	2268	5028	15	1280	28	1983	10	1695
		Aug	2538	5114	23	1926	24	1690	18	1699
		Sep	1891	3772	39	1168	16	934	22	1293
		Oct	1509	2507	34	734	14	607	11	849
		Nov	941	1652	23	240	22	248	23	379
		Dec	733	1352	34	390	56	211	23	291
			17799	31936	321	10194	348	8454	187	10140

MIDDLESEX	Bedford Hanscomb AFB	LTO's	Commercial	13970
			Gen. Ava.	25292
			Military	428

					Itinerent				Local
			Cargo	Trans[illegible]t	Itin GA	Military	Local GA	Local Mil	Instrument
NANTUCK[illegible]	Nantucket (Civillian)	Jan	0	[illegible]476	3280	44	1269	56	131

Mar	0	3504	3465	68	1409	84	1410
Apr	0	3760	3861	81	1394	38	2094
May	0	5124	5505	34	1186	50	2485
Jun	4	5158	5261	58	1290	76	4085
Jul	13	5486	6677	28	682	48	6274
Aug	4	6747	8692	32	1530	24	5184
Sep	3	5339	5995	26	1191	27	3524
Oct	0	4109	4109	22	1028	12	2285
Nov	0	3645	3645	56	1143	28	1400
Dec	0	3451	2848	49	600	44	1181
Total Ops	24	54798	56505	533	14028	545	32223

NANTUCKET Nantucket (Civillian) Total LTO's

Commercial	27411
Gen. Ava.	51378
Military	539

NORFOLK Norwood

		Itinerent		Local			Instrument	
	Transport	Itin GA	Military	Local GA	Local Mil	AT Inst	Civillian	Military
Jan	371	5211	36	4153	0	43	412	4
Feb	383	3584	38	2229	0	35	365	2
Mar	562	5897	57	4874	0	63	542	2
Apr	433	5361	35	4874	0	38	638	0
May	380	6337	74	5508	0	56	681	1
Jun	436	7155	42	7187	0	49	847	2
Jul	462	6861	71	5607	0	54	888	2
Aug	388	7830	73	5102	0	25	881	0
Sep	192	7821	84	5319	0	43	831	1
Oct	348	6177	10	3596	0	37	590	0
Nov	298	5658	2	3539	2	27	445	0
Dec	303	4259	45	2680	0	43	370	0
	4556	72151	567	54668	2	513	7490	14

NORFOLK Norwood Total LTO's

Commercial	6023
Gen. Ava.	67155
Military	292

Operations and LTO's at Massachusetts Aeronautical Commission Airports

WORCESTER	Worcester Muni.		Itinerent			Local		
		Cargo	Transport	Itin GA	Military	Local GA	Local Mil	Instrument
	Jan	385	1250	3936	49	4640	42	ND
	Feb	270	729	3112	17	3108	22	
	Mar	397	1097	4972	57	5948	68	
	Apr	398	799	4752	53	5082	42	
	May	ND						
	Jun	321	506	5157	46	6026	34	
	Jul	ND						
	Aug	ND						
	Sep	329	589	5123	53	4282	32	
	Oct	ND						
	Nov	ND						
	Dec	ND						
	Total Ops	1715	3720	23116	226	24644	240	
	Annual Correction Factor	2	2	2	2	2	2	
	Corrected Total Operations	3430	7440	46232	452	49288	480	

WORCESTER	Worcester Muni.	Total LTO's	Commercial	1715
	Commercial		Gen. Ava.	25110
			Military	466

TABLE D. 1-2 AIRCRAFT ENGINE ISSIONS by AIRPORT and COUN

TABLE D.1-2

AIRCRAFT ENGINE ISSIONS by AIRPORT and COUN

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County	Airport Name	Aircraft Type	LTO's per Yr	VOC	CO	NOx	VOC Ton/Yr	TPSD	CO Ton/Yr	TPSD	NOx Ton/Yr	TPSD
				Pounds per LTO								
BARNSTABLE	Provincetown	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commerecial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
		Military					0.000	0.000	0.000	0.000	0.000	0.000
	Barnstable	General	47049	0.11	3.65	0.02	2.517	0.007	85.864	0.235	0.376	0.001
		Commercial	35914	5.08	7.18	0.80	91.222	0.250	128.931	0.353	14.366	0.039
		Military	670	35.00	70.00	27.00	11.725	0.032	23.450	0.064	9.045	0.025
	Falmouth	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
		Military					0.000	0.000	0.000	0.000	0.000	0.000
	Chatham	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
		Military					0.000	0.000	0.000	0.000	0.000	0.000
	Otis AGB	Military (Tsp)	2894	12.00	42.00	21.00	17.364	0.048	60.774	0.167	30.387	0.083
		Military (Fighter	396	5.08	7.18	0.80	1.006	0.003	1.422	0.004	0.158	0.000
	County Totals	General					2.517	0.007	85.864	0.235	0.376	0.001
		Commercial					91.222	0.250	128.931	0.353	14.366	0.039
		Military					30.095	0.082	85.646	0.235	39.590	0.108
BERKSHIRE	Great Barrington	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
		Military					0.000	0.000	0.000	0.000	0.000	0.000
	Pittsfield	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	North Adams	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000

AIRCRAFT ENGINE EMISSIONS by AIRPORT and COUNTY

County	Airport Name	Aircraft Type	LTO's per Yr	VOC	CO	NOx	VOC Ton/Yr	VOC TPSD	CO Ton/Yr	CO TPSD	NOx Ton/Yr	NOx TPSD
				Pounds per LTO								
	County Total	General					0.000	0.000	0.000	0.000	0.000	0.000
		Commercial					0.000	0.000	0.000	0.000	0.000	0.000
		Military					0.000	0.000	0.000	0.000	0.000	0.000
BRISTOL	New Bedford	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Fall River	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Taunton	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Mansfield	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	County Total	General					0.000	0.000	0.000	0.000	0.000	0.000
		Commercial					0.000	0.000	0.000	0.000	0.000	0.000
		Military										
DUKES	Martha's Vinyard	General	157647	0.11	3.65	0.02	8.434	0.023	287.706	0.788	1.261	0.003
		Commercial	12330	5.08	7.18	0.80	31.318	0.086	44.265	0.121	4.932	0.014
		Military	1715	35.00	70.00	27.00	30.013	0.082	60.025	0.164	23.153	0.063
	Katama	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	County Total	General					8.434	0.023	287.706	0.788	1.261	0.003
		Commercial					31.318	0.086	44.265	0.121	4.932	0.014
		Military					30.013	0.082	60.025	0.164	23.153	0.063

AIRCRAFT ENGINE EMISSIONS by AIRPORT and COUNTY

County	Airport Name	Aircraft Type	LTO's per Yr	VOC	CO	NOx	VOC Ton/Yr	TPSD	CO Ton/Yr	TPSD	NOx Ton/Yr	TPSD
				Pounds per LTO								
ESSEX	Beverly	General	67347	0.11	3.65	0.02	3.603	0.010	122.908	0.337	0.539	0.001
		Commercial	35	5.08	7.18	0.80	0.089	0.000	0.126	0.000	0.014	0.000
		Military	184	35.00	70.00	27.00	3.220	0.009	6.440	0.018	2.484	0.007
	Newburyport (Plumb Island)	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Haverhill	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
		Military					0.000	0.000	0.000	0.000	0.000	0.000
	Lawrence Muni.	General	37343	0.11	3.65	0.02	1.998	0.005	68.151	0.187	0.299	0.001
		Commercial	29780	5.08	7.18	0.80	75.641	0.207	106.910	0.293	11.912	0.033
		Military	75	35.00	70.00	27.00	1.313	0.004	2.625	0.007	1.013	0.003
	County Total	General					5.601	0.015	191.059	0.523	0.838	0.002
		Commercial					75.730	0.207	107.036	0.293	11.926	0.033
		Military					4.533	0.012	9.065	0.025	3.497	0.010
FRANKLIN	Turners Falls	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Orange Muni.	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	County Total	General					0.000	0.000	0.000	0.000	0.000	0.000
		Commercial					0.000	0.000	0.000	0.000	0.000	0.000
		Military										
HAMPDEN	Westfield	General	63012	0.11	3.65	0.02	3.371	0.009	114.997	0.315	0.504	0.001

AIRCRAFT ENGINE EMISSIONS by AIRPORT and COUNTY

County	Airport Name	Aircraft Type	LTO's	VOC	CO	NOx	VOC		CO		NOx	
			per Yr	Pounds per LTO			Ton/Yr	TPSD	Ton/Yr	TPSD	Ton/Yr	TPSD
	(Barns AGB)	Commercial	65	5.08	7.18	0.80	0.165	0.000	0.233	0.001	0.026	0.000
		Military	9732	5.08	7.18	0.80	24.719	0.068	34.938	0.096	3.893	0.011
	Chicopee	General	0	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
	(Westover AGB)	Commercial	0	5.08	7.18	0.80	9.500	0.026	33.800	0.093	1.500	0.004
		Military (from Draft Supplemental EIS)					80.100	0.219	183.600	0.503	79.800	0.219
	Palmer	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	County Total	General					3.371	0.009	114.997	0.315	0.504	0.001
		Commercial					9.665	0.026	34.033	0.093	1.526	0.004
		Military					104.819	0.287	218.538	0.599	83.693	0.229
HAMPSHIRE	North Hampton	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	County Total	General					0.000	0.000	0.000	0.000	0.000	0.000
		Commercial					0.000	0.000	0.000	0.000	0.000	0.000
		Military										
MIDDLESEX	Bedford	General	25292	0.11	3.65	0.02	1.353	0.004	46.158	0.126	0.202	0.001
	(Hanscom Field)	Commercial	13970	5.08	7.18	0.80	35.484	0.097	50.152	0.137	5.588	0.015
		Military	428	35.00	70.00	27.00	7.490	0.021	14.980	0.041	5.778	0.016
	Marlborough	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Tewksbury	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Stow	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000

AIRCRAFT ENGINE EMISSIONS by AIRPORT and COUNTY

County	Airport Name	Aircraft Type	LTO's per Yr	VOC	CO	NOx	VOC		CO		NOx	
					Pounds per LTO		Ton/Yr	TPSD	Ton/Yr	TPSD	Ton/Yr	TPSD
	Pepperill	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Shirley	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Ayer (Fort Devens)	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
		Military					0.000	0.000	0.000	0.000	0.000	0.000
	County Total	General					1.353	0.004	46.158	0.126	0.202	0.001
		Commercial					35.484	0.097	50.152	0.137	5.588	0.015
		Military					7.490	0.021	14.980	0.041	5.778	0.016
NANTUCKET	Nantucket	General	51378	0.11	3.65	0.02	2.749	0.008	93.765	0.257	0.411	0.001
		Commercial	27411	5.08	7.18	0.80	69.624	0.191	98.405	0.270	10.964	0.030
		Military	539	35.00	70.00	27.00	9.433	0.026	18.865	0.052	7.277	0.020
	County Total	General					2.749	0.008	93.765	0.257	0.411	0.001
		Commercial					69.624	0.191	98.405	0.270	10.964	0.030
		Military					9.433	0.026	18.865	0.052	7.277	0.020
NORFOLK	Norfolk	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Medway (Hopedale)	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	South Weymouth (NAS)	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
		Military					0.000	0.000	0.000	0.000	0.000	0.000

AIRCRAFT ENGINE EMISSIONS by AIRPORT and COUNTY

County	Airport Name	Aircraft Type	LTO's per Yr	VOC	CO	NOx	VOC Ton/Yr	TPSD	CO Ton/Yr	TPSD	NOx Ton/Yr	TPSD
				Pounds per LTO								
	Norwood	General	67155	0.11	3.65	0.02	3.593	0.010	122.558	0.336	0.537	0.001
		Commercial	6023	5.08	7.18	0.80	15.298	0.042	21.623	0.059	2.409	0.007
		Military	292	5.08	7.18	0.80	0.742	0.002	1.048	0.003	0.117	0.000
	County Total	General					3.593	0.010	122.558	0.336	0.537	0.001
		Commercial					15.298	0.042	21.623	0.059	2.409	0.007
		Military					0.742	0.002	1.048	0.003	0.117	0.000
PLYMOUTH	Marshfield	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial	ND	5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Middleborough	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Cranland	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Carver	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	County Total	General					0.000	0.000	0.000	0.000	0.000	0.000
		Commercial					0.000	0.000	0.000	0.000	0.000	0.000
		Military										
SUFFOLK	Boston (Logan)	General	24976	0.11	3.65	0.02	1.336	0.004	45.581	0.125	0.200	0.001
		Commercial	Sum from Massport FGEIR				1281.2	3.5	3407.2	9.3	1974.8	5.4
		Military	272	35.00	70.00	27.00	4.760	0.013	9.520	0.026	3.672	0.010
	County Total	General					1.336	0.004	45.581	0.125	[illegible]	0.001
		Commercial					1281.200	3.510	3407.200	9.335	[illegible]	5.410

AIRCRAFT ENGINE EMISSIONS by AIRPORT and COUNTY

County	Airport Name	Aircraft Type	LTO's per Yr	VOC	CO	NOx	VOC		CO		NOx	
				Pounds per LTO			Ton/Yr	TPSD	Ton/Yr	TPSD	Ton/Yr	TPSD
		Military					4.760	0.013	9.520	0.026	3.672	0.010
WORCESTER	Gardner	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Barre (Tanner-Hiller)	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Southbridge	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Oxford	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	Worcester Muni.	General	25110	0.11	3.65	0.02	1.343	0.004	45.826	0.126	0.201	0.001
		Commercial	1715	5.08	7.18	0.80	4.356	0.012	6.157	0.017	0.686	0.002
		Military	466	35.00	70.00	27.00	8.155	0.022	16.310	0.045	6.291	0.017
	Sterling	General	ND	0.11	3.65	0.02	0.000	0.000	0.000	0.000	0.000	0.000
		Commercial		5.08	7.18	0.80	0.000	0.000	0.000	0.000	0.000	0.000
	County Total	General					1.343	0.004	45.826	0.126	0.201	0.001
		Commercial					4.3561	0.01193	6.15685	0.0169	0.686	0.0019
		Military					8.155	0.02234	16.31	0.0447	6.291	0.0172
				STATE TOTA		General	33.31	0.09	993.85	2.72	5.02	0.01
						Commercia	1617.70	4.43	3907.96	10.71	2032.80	5.57
						Military	191.88	0.53	417.69	1.14	166.78	0.46
				STATE GRAND TOTAL			1842.89	5.05	5319.49	14.57	2204.59	6.04

TOTAL AIRCRAFT EMISSIONS FOR 1990 TONS PER SUMMER DAY

aircrsum6b

COUNTIES	GENERAL VOC	CO	NOX	COMMERCIAL VOC	CO	NOX	MILITARY VOC	CO	NOX	TOTAL VOC	TOTAL CO & TPWD	TOTAL NOX
BARNSTABLE	0.007	0.235	0.001	0.250	0.353	0.039	0.082	0.235	0.108	0.339	0.823	0.148
BERKSHIRE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BRISTOL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DUKES	0.023	0.788	0.003	0.086	0.121	0.014	0.082	0.164	0.063	0.191	1.073	0.080
ESSEX	0.015	0.523	0.002	0.207	0.293	0.033	0.012	0.025	0.010	0.234	0.841	0.045
FRANKLIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HAMPDEN	0.009	0.315	0.001	0.026	0.093	0.004	0.287	0.599	0.229	0.322	1.007	0.234
HAMPSHIRE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MIDDLESEX	0.004	0.126	0.001	0.097	0.137	0.015	0.021	0.041	0.016	0.122	0.304	0.032
NANTUCKET	0.008	0.257	0.001	0.191	0.270	0.030	0.026	0.052	0.020	0.225	0.579	0.051
NORFOLK	0.010	0.336	0.001	0.042	0.059	0.007	0.002	0.003	0.000	0.054	0.398	0.008
PLYMOUTH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUFFOLK	0.004	0.125	0.001	3.500	9.300	5.400	0.013	0.026	0.010	3.517	9.451	5.411
WORCESTER	0.004	0.126	0.001	0.012	0.017	0.002	0.022	0.045	0.017	0.038	0.188	0.020
STATE	0.084	2.831	0.012	4.411	10.643	5.544	0.547	1.190	0.473	5.042	14.664	6.029

REFERENCES FOR AIRCRAFT

1. "Airport Activity Statistics of Certified Air Route Carriers", Federal Aviation Administration, U.S. Department of Transportation, Research and Special Programs Administration, CY 1987. Washington, DC. Annual Publication, 1990.

2. EPA, "Compilation of Air Pollutant Emission Factors," Volume II, Mobile Sources 4th Ed. Office of Air and Radiation, Office of Mobile Sources, Ann Arbor, MI. September, 1985.

3. EPA, "Procedures for Emission Inventory Preparation", Volume IV: Mobile Sources (Revised) OAQPS, Emission Control Technology Division Office of Mobile Sources, RTP, NC. July, 1989.

4. "FAA Air Traffic Activity", Federal Aviation Administration U.S. Department of Transportation, Office of Management Systems, FY 1990., Washington, DC. Annual Publication, December 1991.

5. "Massachusetts Airport System Plan, Topics II & III", "Unconstrained Airport Classification", "Aircraft Fleet Mix and Aircraft Registrations". Massachusetts Aeronautics Commission Park Plaza, Boston, July 13, 1989.

6. "Air Traffic Statistics 1986 and 1987", Massachusetts Port Authority, Planning and Program Department, Aviation Department, Boston, Massachusetts.

7. Correspondence with the Department of the Air Force concerning Air National Guard operations at Barns Municipal Airport, Westfield, Hampden County, Massachusetts. February 27, 1992

8. Correspondence with the Department of the Air Force concerning operations at Otis Air National Guard Base, Mashpee, Barnstable County, Massachusetts. April 3, 1992.

REFERENCES FOR AIRCRAFT

9. "Aircraft Engine Emissions Estimator", Engineering & Services Laboratory, Air Force Engineering & Services Center, Tyndall Air Force Base, Florida, 32403. Available through National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

10. Correspondence with Mr. Robert C. Martin, Jr. of Spectrum Sciences and Software, Inc., 1827 Powers Ferry Road, Building 20, Suite 225, Marietta, GA 30067. September 19

11. "Draft Supplemental Environmental Impact Statement, Military and Civilian Aircraft Operations at Westover Air Reserve Base, Massachusetts" by the Department of the Air Force, Head quarters, Air Force Reserve, Robbins Air Force Base, Georgia. June 1993.

12. "Final Generic Environmental Impact Report, Boston-Logan International Airport", prepared for the Massachusetts Port Authority by Vanasse Hagen Brustlin, Inc. July 15, 1993

13. Air Navigation Sectional Chart, New York Region, Federal Aviation Administration, by U.S. Dept. of Commerce, National Oceanographic and Atmospheric Administration, Washington, D.C.

14. Correspondence with the Manager of Aviation Planning, Massachusetts Aeronautical Commission providing historical operation statistics on the airports operated by the Commission. November 1, 1990.

File Name- AIREMIS4.INV (Word Perfect File)

D.2 RAILROAD LOCOMOTIVES

Railroad locomotives are primarily of two types: electric and diesel-electric powered. Electric locomotives are powered by electricity generated at stationary power plants which are generally inventoried as point sources. Diesel-electric locomotives use a diesel engine and generator to produce the required electrical power. There are two methodologies for estimating emissions from diesel locomotives as described in Section 6 of the revised interim Volume IV.[4] Both methods require the derivation of an activity factor and an appropriate emission factor to generate emissions. The first method is used for this inventory which uses the estimated quantity of diesel fuel consumed for railroad operations as the activity factor, and an AP-42[3] emissions factor per gallon of diesel burned. The second methodology entitled "Tailoring Methods" is more complex in that it involves the derivation of work output estimates for locomotives.

The activity factor for diesel locomotives in this first methodology is based on estimated Massachusetts diesel usage for 1990. The railroad companies were directly contacted to obtain diesel fuel use but those that operate interstate did not have any breakdowns by state. The MBTA and several other local state railway companies provided local data.

The annual route miles for each company was obtained from the Massachusetts 1989 State Rail Plan which is the latest report to date.[7] The total quantity of diesel fuel used by railroad

[illegible]

locomotives for line haul operation was estimated at 12,665,737 gallons in 1990 as shown in Table D.2-1. This was apportioned to counties based on track miles from the 1983/84 State Rail Plan and documented in the DEP Growth Factor File[6] as 1163 miles. This was calculated by measuring the actual length of each of the railways on the railway maps in the 1983/84 State Rail Plan for each county.

Railroad diesel fuel usage was obtained for the entire railroad operations, some of which operate interstate. The methodology used for estimating diesel fuel used in Massachusetts was to take the total diesel fuel usage for the entire railroad route mile to get a diesel usage factor per route mile. This diesel per route mile factor was then applied to the operating route miles for that railroad in Massachusetts obtained from the State Rail Plan.[7] For example for the Boston and Maine Railroad Company, the total route miles of 1,899 and the diesel usage of 3.5 million gallons gives a factor of 1,843.1 gallons diesel per route mile as shown in Table D.2-1. This factor applied to 450.1 Massachusetts route miles gives an estimated 829,568 gallons diesel for the Boston and Maine Railway. This methodology was applied to all the other interstate railroads operating in Massachusetts and the state diesel usage was estimated and presented in Table D.2-1.

For those railroad companies that could not be contacted, their diesel fuel usage had to be estimated based on route

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mileage. This was done by calculating the average diesel use per route mile for all the railroads, and as presented in Table D.2-1, this was calculated at 5,968 gallons diesel per route mile. This average was then applied to the non-reporting railroads' route miles.

The methodology given in Volume IV[4] is to use the gross ton mile estimate for Class 1 railroads and the allocation of fuel consumption by track length or density for Class II and III railroads.

According to the Association of American Railroads,[1] the Consolidated Rail Corporation (Conrail) is the only class 1 railroad operating in Massachusetts. According to Volume IV[4] each Class 1 railroad is required to report their fuel consumption index in terms of gross ton miles per gallon (GTM/gal) to the Interstate Commerce Commission (ICC)[9] in an annual report entitled "R-1." Table D.2-2 presents the emissions estimation for Conrail's line haul operation in Massachusetts. The switchyard operation emissions were estimated by apportioning the Conrail's national switchyard fuel estimate by using the ratio of state and national track miles and presented in Table D.2-1. Emission factors are given in revised Volume IV Table 6-1 for line haul locomotives in pounds per gallon of diesel. The revised Volume IV Tables 6-2 and 6-3 present emission factors for switchyard locomotives in pounds per year per locomotive and in pounds per gallon for switchyard diesel usage.

Railroad companies were also contacted for the number of switchyard locomotives operating in a typical day. The smaller

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rail companies reported no switchyards which operate a few miles of rail. The following is an example of the railroad emission calculations for the Boston and Maine Railroad Co and presented in Table D.2-1:

Line Haul

(3,500,000 total gal. diesel/1,899 total miles) X 450.1 Mass. Miles = 829,568 gallons

829,568 gallons diesel X 0.0211 lb VOC/gal diesel/2000 lbs.
= 8.75 Tons VOC
X 0.4931 lb NOx/gal. diesel/2,000 lbs
= 204.53 Tons NOx
X 0.0626 lb CO/gal diesel/2,000 lbs.
= 25.97 Tons CO

Switchyard Operations

8 Switchyard Locomotives X 4,174 lb VOC/Year/2,000 lbs
= 16.70 Tons VOC
X 41,608 lb NOx/Year/2,000 lbs.
= 166.43 Tons NOx
X 7,375 lb CO/Year/2,000 lbs.
= 29.50 Tons CO

Total Combined Emissions for Boston & Maine for 1990 was 25.45 Tons VOC, 370.96 Tons NOx and 55.47 Tons CO as presented in Table D.2-1.

Emissions were calculated similarly for other railroad companies and are presented in Table D.2-1. Statewide diesel fuel use and switchyard locomotives were apportioned to counties based on route miles per county which was originally estimated from the 1983/84 Massachusetts State Rail Plan[7] and adjusted for 1987. The 1989/90 county apportionment is expected to remain the same because the route miles was the same as 1987 at 1178.9 miles. This apportionment to counties is presented in the first three columns of Table D.2-3 to D.2-5. County emissions were then estimated and seasonally adjusted. According to Section 6.1

of the revised Volume IV,[4] railroad traffic is relatively constant throughout the year. Telephone interviews with several rail companies also confirmed this seasonal uniformity.

County emissions in tons per year and tons per summer/winter day are presented for VOC, NOx and CO in Tables D.2-3 to D.2-5. Railroad operations accounted for 210.12 TPY or 0.576 TPSD VOC, 3,885.25 TPY or 10.645 TPSD NOx and 531.59 TPY or 1.456 TPSD/TPWD CO. Composite emission factors were estimated in order to facilitate input into AIRS/AMS as presented in Table D.2-6.

TABLE D.2-1 RAILROAD LINE AND SWITCHYARD EMISSIONS 1990

rail90

RAILROAD CO	SWITCH LOCOM REPORTED	DIESEL GALLONS REPORTED	TOTAL R.MILES	MASS R.MILES	MASS % R.ML	ESTIM MASS GL DIESEL	ESTIM DIESL/ R.ML	LINE VOC EF.0211 LB/GAL EM.TONS	LINE NOX 0.4931 LB/GAL EM.TONS	LINE CO 0.0626 LB/GAL EM.TONS	SWITCH	SWITCH VOC 4174 LB/YR EM.TONS	SWITCH NOX 41608 LB/YR EM.TONS	SWITCH CO 7375 LB/YR EM.TONS	TOTAL RAIL VOC EM TPY	TOTAL RAIL NOX EM TPY	TOTAL RAIL CO EM TPY
=========	=======	=========	======	======	======	======	=====	========	=======	=======		=======	=======	=======	=======	=======	=======
BAY COLONY	9	23000	124	119.6	96.5%	22184	185	0.23	5.47	0.69	9	18.78	187.24	33.19	19.02	192.71	33.88
MASS CENTRAL	2	25199	27	27	100.0%	25199	933	0.27	6.21	0.79	2	4.17	41.61	7.38	4.44	47.82	8.16
BOS & MAINE	8	3500000	1899	450.1	23.7%	829568	1843	8.75	204.53	25.97	8	16.70	166.43	29.50	25.45	370.96	55.47
PROV & WORC	6	450000	343	68.1	19.9%	89344	1312	0.94	22.03	2.80	6	12.52	124.82	22.13	13.46	146.85	24.92
PIONEER VA	0	35144	27	27	100.0%	35144	1302	0.37	8.66	1.10	0	0.00	0.00	0.00	0.37	8.66	1.10
FORERIV MWRA	0	400	2.4	2.4	100.0%	400	167	0.00	0.10	0.01	0	0.00	0.00	0.00	0.00	0.10	0.01
N.ENG SOUTH	0	20000	56	56	100.0%	20000	357	0.21	4.93	0.63	0	0.00	0.00	0.00	0.21	4.93	0.63
MBTA/AMTRAK	0	7487004	261.6	256	97.9%	7326732	28620	77.30	1806.41	229.33	0	0.00	0.00	0.00	77.30	1806.41	229.33
												VOC EF	NOX EF	CO EF			
										961200.		0.0506	0.5044	0.0894			
												LB/GAL	LB/GAL	LB/GAL			
												------	------	------			
CONRAIL	27896562		12828	442	3.446%	4299262	9727	45.36	1059.98	134.57		24.32	242.41	42.97	69.68	1302.40	177.53
		3186828000 GTM /741.25 GTM/GL					AVERAGE 4938										
CENTRAL VT	0		375	55	14.7%	5968	5968	0.06	1.47	0.19					0.06	1.47	0.19
GRAFTON & UP	0		-	14.1	ND	5968	5968	0.06	1.47	0.19					0.06	1.47	0.19
HAUSATONIC	0		-	77	ND	5968	5968	0.06	1.47	0.19					0.06	1.47	0.19
															------	------	------
												24.32	242.41	42.97	210.12	3885.25	531.59
				TOTAL		12665737		133.62	3122.74	396.44	25	52.18	520.10	92.19	210.12	3885.25	531.60

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TABLE B.2-2

consep

CONRAIL'S LINE HAUL EMISSIONS ESTIMATION IN MASSACHUSETTS

```
GROSS TON MILES IN MASS 1991 :                    = 3,186,828,000 GTM
 (Source: Conrail's response to Interrogatary #14)

GROSS TON MILES PER GALLON OF FUEL QUARTERLY:         710
 (Source: Conrail Full Year Fact Book 1990,           743
   P.42)                                              781
                                                      731
                                                   ------   -----------
                                                     2965   741.25 AVG

                   GROSS TON MILES             3186828000
GALLONS OF FUEL =  ------------------------ =  ---------
                   GROSS TON MILE PER GALLON      741.25

                                             = 4299262.05 GALLONS
                                                          DIESEL
```

EMISSIONS ESTIMATION FOR LINE HAUL LOCOMOTIVES :
(Source: EPA Procedures Vol.IV Ch.6 Locomotives, Table 6-1)

POLLUTANTS	4299262.1 EMISS.FAC LB/GALL	EMISSIONS TONS 1990/91
HYDROCARBONS	0.0211	45.36
CARBON MONOXIDE	0.0626	134.57
NITROGEN OXIDES	0.4931	1059.98

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TABLE D.2-3

RAILROAD EMISSIONS 1990 APPORTIONED TO COUNTIES - VOC

railcnty
VOC

COUNT	MILES PER COUNTY	ADJUSTED RTE MLS PER CNTY	% PER COUNTY	LINE ESTIM DIESEL USED GALLS	LINE TPY VOC EM EF.021 LB/GAL	SWITCH ESTIM LOCOM OPER	SWITCH LOCOM EF 4174 LB/YEAR VOC TPY	SWITCH ESTIM DIESEL CONRAIL GALLONS	SWITCH CONRAIL EF.0506 LB/GAL VOC TPY	TOTAL RAIL VOC EMISS TPY	/365 TOTAL RAIL VOC EMISS TPSD & TPWD
======	=====	========	=====	======	======	======	=======	=======	=======	=======	=======
		*1.421324									
BARNST	45	63.96	3.9%	490076	5.17	1.0	2.02	37192	0.94	8.13	0.022
BERKSH	100	142.13	8.6%	1089057	11.49	2.1	4.49	82648	2.09	18.07	0.049
BRISTO	79	112.28	6.8%	860355	9.08	1.7	3.54	65292	1.65	14.27	0.039
DUKES	0	0.00	0.0%	0	0.00	0.0	0.00	0	0.00	0.00	0.000
ESSEX	110	156.35	9.5%	1197963	12.64	2.4	4.93	90913	2.30	19.87	0.054
FRANKL	97	137.87	8.3%	1056386	11.14	2.1	4.35	80169	2.03	17.52	0.048
HAMPDE	107	152.08	9.2%	1165291	12.29	2.3	4.80	88434	2.24	19.33	0.053
HAMPSH	49	69.64	4.2%	533638	5.63	1.1	2.20	40498	1.02	8.85	0.024
MIDDLE	138	196.14	11.9%	1502899	15.86	3.0	6.19	114055	2.89	24.93	0.068
NANTUC	0	0.00	0.0%	0	0.00	0.0	0.00	0	0.00	0.00	0.000
NORFOL	100	142.13	8.6%	1089057	11.49	2.1	4.49	82648	2.09	18.07	0.049
PLYMOU	69	98.07	5.9%	751450	7.93	1.5	3.10	57027	1.44	12.47	0.034
SUFFOL	55	78.17	4.7%	598982	6.32	1.2	2.47	45457	1.15	9.94	0.027
WORCES	214	304.16	18.4%	2330583	24.59	4.6	9.60	176867	4.47	38.66	0.106
STATE	1163	1653.00	100.0%	12665737	133.62	25.0	52.18	961200	24.32	210.12	0.576
	1163	1653	1	12665737	134	25	52	961200	24.32	210.12	0.576

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TABLE D.2-4

RAILROAD EMISSIONS 1990 APPORTIONED TO COUNTIES - NOX

railnox

COUNT	MILES PER COUNTY	ADJUSTED RTE MLS PER CNTY	% PER COUNTY	LINE ESTIM DIESEL USED GALLS	LINE TPY NOX EM EF.4931 LB/GAL	SWITCH ESTIM LOCOM OPER	SWITCH LOCOM EF 41608 LB/YEAR NOX TPY	SWITCH ESTIM DIESEL CONRAIL GALLONS	SWITCH CONRAIL EF.5044 LB/GAL NOX TPY	TOTAL RAIL NOX EMISS TPY	/365 TOTAL RAIL NOX EMISS TPSD & TPWD
======	=====	========	=====	======	======	======	=======	=======	=======	=======	=======
		*1.421324									
BARNST	45	63.96	3.9%	490076	120.83	1.0	20.12	37192	9.38	150.33	0.412
BERKSH	100	142.13	8.6%	1089057	268.51	2.1	44.72	82648	20.84	334.07	0.915
BRISTO	79	112.28	6.8%	860355	212.12	1.7	35.33	65292	16.47	263.92	0.723
DUKES	0	0.00	0.0%	0	0.00	0.0	0.00	0	0.00	0.00	0.000
ESSEX	110	156.35	9.5%	1197963	295.36	2.4	49.19	90913	22.93	367.48	1.007
FRANKL	97	137.87	8.3%	1056386	260.45	2.1	43.38	80169	20.22	324.05	0.888
HAMPDE	107	152.08	9.2%	1165291	287.30	2.3	47.85	88434	22.30	357.46	0.979
HAMPSH	49	69.64	4.2%	533638	131.57	1.1	21.91	40498	10.21	163.70	0.448
MIDDLE	138	196.14	11.9%	1502899	370.54	3.0	61.71	114055	28.76	461.02	1.263
NANTUC	0	0.00	0.0%	0	0.00	0.0	0.00	0	0.00	0.00	0.000
NORFOL	100	142.13	8.6%	1089057	268.51	2.1	44.72	82648	20.84	334.07	0.915
PLYMOU	69	98.07	5.9%	751450	185.27	1.5	30.86	57027	14.38	230.51	0.632
SUFFOL	55	78.17	4.7%	598982	147.68	1.2	24.60	45457	11.46	183.74	0.503
WORCES	214	304.16	18.4%	2330583	574.61	4.6	95.70	176867	44.61	714.91	1.959
STATE	1163	1653.00	100.0%	12665737	3122.7	25.0	520.10	961200	242.41	3885.25	10.645
	1163	1653	1	12665737	3122.7	25	520	961200	242.41	3885.252	10.645

TABLE D.2-5

RAILROAD EMISSIONS 1990 APPORTIONED TO COUNTIES - CO

railCO

COUNT	MILES PER COUNTY	ADJUSTED RTE MLS PER CNTY	% PER COUNTY	LINE ESTIM DIESEL USED GALLS	LINE TPY NOX EM EF.0626 LB/GAL	SWITCH ESTIM LOCOM OPER	SWITCH LOCOM EF 7375 LB/YEAR NOX TPY	SWITCH ESTIM DIESEL CONRAIL GALLONS	SWITCH CONRAIL EF.0894 LB/GAL NOX TPY	TOTAL RAIL NOX EMISS TPY	/365 TOTAL RAIL NOX EMISS TPSD & TPWD
		*1.421324									
BARNST	45	63.96	3.9%	490076	15.34	1.0	3.57	37192	1.66	20.57	0.056
BERKSH	100	142.13	8.6%	1089057	34.09	2.1	7.93	82648	3.69	45.71	0.125
BRISTO	79	112.28	6.8%	860355	26.93	1.7	6.26	65292	2.92	36.11	0.099
DUKES	0	0.00	0.0%	0	0.00	0.0	0.00	0	0.00	0.00	0.000
ESSEX	110	156.35	9.5%	1197963	37.50	2.4	8.72	90913	4.06	50.28	0.138
FRANKL	97	137.87	8.3%	1056386	33.06	2.1	7.69	80169	3.58	44.34	0.121
HAMPDE	107	152.08	9.2%	1165291	36.47	2.3	8.48	88434	3.95	48.91	0.134
HAMPSH	49	69.64	4.2%	533638	16.70	1.1	3.88	40498	1.81	22.40	0.061
MIDDLE	138	196.14	11.9%	1502899	47.04	3.0	10.94	114055	5.10	63.08	0.173
NANTUC	0	0.00	0.0%	0	0.00	0.0	0.00	0	0.00	0.00	0.000
NORFOL	100	142.13	8.6%	1089057	34.09	2.1	7.93	82648	3.69	45.71	0.125
PLYMOU	69	98.07	5.9%	751450	23.52	1.5	5.47	57027	2.55	31.54	0.086
SUFFOL	55	78.17	4.7%	598982	18.75	1.2	4.36	45457	2.03	25.14	0.069
WORCES	214	304.16	18.4%	2330583	72.95	4.6	16.96	176867	7.91	97.82	0.268
STATE	1163	1653.00	100.0%	12665737	396.44	25.0	92.19	961200	42.97	531.59	1.456
	1163	1653	1	12665737	396.4	25	92	961200	42.97	531.591	1.456

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                    TABLE D.2-6    RAILROAD LOCOMOTIVE EMISSIONS 1990
railams1
    SCC :      22-85-002-000


    STATE ACTIVITY LEVEL :      13,678,457 GALLONS
                                           uniform   uniform                                                                      CO PO    CO PO
    COUNTY ACTIVITY LEVEL :          ANNUAL    OZ PO     CO PC      VOC TPY  VOC PO       NOX TPY  NOX PO        CO TPY  TPWD   LB PWD
    ----------------------           ACTIVITY   ACTIV  ACTIVITY     EM.FAC    TPSD        EM.FAC    TPSD        EM.FAC  TPSD   LB PSD
    COUNTIES   POP 1990    %            GALS  /365*92   /365*92  .030723LB/GL     /92  .568083LB/GAL    /92  .07773LB/GL   /92      /92
    ========  =========  ====        =======  =======   =======    ========  ======     ========  ======      ======== =====    =====
  1 BARNSTABLE    63.96    3.9%      529271   133405    133405        8.13   0.022       150.33   0.412        20.57 0.056    112.7
  2 BERKSHIRE    142.13    8.6%     1176130   296449    296449       18.07   0.049       334.07   0.915        45.71 0.125    250.5
  3 BRISTOL      112.28    6.8%      929120   234189    234189       14.27   0.039       263.91   0.723        36.11 0.099    197.9
  4 DUKES          0.00    0.0%           0        0         0        0.00   0.000         0.00   0.000         0.00 0.000      0.0
  5 ESSEX        156.35    9.5%     1293801   326109    326109       19.87   0.054       367.49   1.007        50.28 0.138    275.5
  6 FRANKLIN     137.87    8.3%     1140878   287564    287564       17.53   0.048       324.06   0.888        44.34 0.121    243.0
  7 HAMPDEN      152.08    9.2%     1258466   317202    317202       19.33   0.053       357.46   0.979        48.91 0.134    268.0
  8 HAMPSHIRE     69.64    4.2%      576273   145252    145252        8.85   0.024       163.69   0.448        22.40 0.061    122.7
  9 MIDDLESEX    196.14   11.9%     1623064   409101    409101       24.93   0.068       461.02   1.263        63.08 0.173    345.6
 10 NANTUCKET      0.00    0.0%           0        0         0        0.00   0.000         0.00   0.000         0.00 0.000      0.0
 11 NORFOLK      142.13    8.6%     1176130   296449    296449       18.07   0.049       334.07   0.915        45.71 0.125    250.5
 12 PLYMOUTH      98.07    5.9%      811532   204551    204551       12.47   0.034       230.51   0.632        31.54 0.086    172.8
 13 SUFFOLK       78.17    4.7%      646859   163044    163044        9.94   0.027       183.73   0.503        25.14 0.069    137.7
 14 WORCESTER    304.16   18.4%     2516933   634405    634405       38.66   0.106       714.91   1.959        97.82 0.268    536.0
                                                                 0
    STATE       1652.98  100.0%    13678457  3447721   3447721      210.12   0.576      3885.25  10.645       531.59 1.456   2912.8
                                   13678457                         210.12              3885.25               531.59
ACTIVITY LEVEL UNITS :        GALLONS                                                                               ANNUAL   ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                           NON-ATT   COUNTY       TOWN  COUNTY          %TOWN  ACTIV  CO TPY    ACTIV    TPWD
ACTIVITY LEVEL METHOD :                                          TOWNS                POPUL   POPUL          /CNTY GALLNS .07773LB GALLNS   /92
                                                               =======   ======    ======== =======          ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :           7                                 BOSTON   SUFF25      574283  663906          86.5%559537   21.75  141034  0.060
 WEEKS/YEAR :                 52        PO THRUPUT : 25.2 %  CAMBRIDGE   MIDX21       95802 1398468           6.9%111188    4.32   28025  0.012
                                                                QUINCY   NORF23       84985  616087          13.8%162239    6.31   40893  0.017
PEAK CO DAYS/WEEK :           7                                MEDFORD   MIDX21       57407 1398468           4.1% 66627    2.59   16794  0.007
WEEKS/YEAR :                  52        PC THRUPUT : 25.2 %     REVERE   SUFF25       42786  663906           6.4% 41687    1.62   10508  0.004
                                                                MALDEN   MIDX21       53884 1398468           3.9% 62538    2.43   15763  0.007
EMISSION FACTORS :      VOC:  .030723    (COMPOSITE EMISS      CHELSEA   SUFF25       28710  663906           4.3% 27973    1.09    7051  0.003
                        NOX:  .568083       FACTORS)           EVERETT   MIDX21       35701 1398468           2.6% 41435    1.61   10444  0.004
                        CO:   .077727                       SOMERVILLE   MIDX21       76210 1398468           5.4% 88449    3.44   22294  0.009
EMISSION FACTOR UNITS :       LB/GAL    VOL IV CHAP.6                                             TOTAL MET.BOSTON     45.15  292805  0.124
                                                             WORCESTER   WORC26      169759  709705          23.9%602042   23.40  151747  0.064
RULE EFFECTIVENESS :          N/A                          SPRINGFIELD   HAMD19      156983  456310          34.4%432947   16.83  109126  0.046
RULE PENETRATION :            N/A                               LOWELL   MIDX21      103439 1398468           7.4%120051    4.67   30260  0.013
SIP RULE :                    NO                               WALTHAM   MIDX21       57878 1398468           4.1% 67173    2.61   16931  0.007

PO INTERVAL :                 1 HR
PC INTERVAL :                 8 HR

WEEKDAY:         72 %      SAT : 14%       SUN :      14%

COMMENTS:      SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT NOV-JAN (FOR AMS)
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REFERENCES FOR RAILROAD LOCOMOTIVES

1. Association of American Railroads "Railroads Operating in Massachusetts - 1991. From Profiles of U.S. Railroads - 1991 Edition.

2. Department of Energy/Energy Information Administration (DOE/EIA) "Petroleum Marketing Monthly" Washington, D.C. June 1988.

3. EPA "Compilation of Air Pollutant Emission Factors". Volume II: Mobile Sources. Motor Vehicle Emission Lab. Ann Arbor Michigan. AP-42 4th Ed. Sept. 1985, Supplement A, January 1991.

4. EPA "Procedures for Emission Inventory Preparation Volume IV: Mobile Sources." DAQPS and Office of Mobile Sources-EPA-450/4-81 RTP, N.C. July 1989. Revised Handout of Section 6 EPA Mobile Source Workshop November 13,14 1991, EPA Region 1, Boston.

5. Massachusetts Bay Transportation Authority (MBTA). Railroad Operations Directorate - Train Fuel Analysis CY 1987 September 1988.

6. Massachusetts DEP. Division of Air Quality Control. Growth Factor File for Post '87 Ozone State Implementation Plan, August 1988.

7. Massachusetts "State Rail Plans 1983-84, 1987-1988, and 1989 Updates." Executive Office of Transportation and Construction (EOTC), September 1989. December 1984 and June 1989.

8. Railroad Companies Contacted for Fuel Usage in 1987:

    AMTRACK - Susan Walker
    Bay Colony - John Pimento, Philis Cook, Jesse Richardson.
    Boston/Maine Rail Corp, Springfield Terminal - Vinay Mudholkar, Heidi Evans
    Cape Cod Hyannis - Mr. Snyder
    Central Vermont - Mr. Dushane
    Commuter Rail (MBTA) - Margaret Zirker, Steve Gilchrist
    Consolidated Rail Corp (Conrail) - Jack Barthwell
    Pioneer Valley - Mark Levine, David Quink
    Providence & Worcester - Clark Brown, D. P. Coffey,

9. Interstate Commerce Commission (ICC) Certification Unit, Washington DC. Railroad Annual Report R-1, Year 1990.

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10. Attorney General's Office, Conrail's Response to Interrogatory #14. September 1992.

11. Consolidated Rail Fuel Year Factbook, 1990, Conrail, Philadelphia PA.

RAIL90

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D.3 VESSELS file:vessfin

Marine activity is classified as either recreational, commercial and military. Recreational boating was originally estimated in this section for the Draft Inventory but is now estimated in EPA-OMS Non-Road Engine Study and presented in the next section D.4.

According to Volume IV commercial vessels include boats and ships involved in commercial and military activity and vary from 20 ft. to over 1,000 ft. in length. The majority of commercial vessels are increasingly using diesel in the U.S. High speed commercial and military crafts such as hydrofoils generally use gasoline fuel. Commercial vessels use both distillate and residual fuel oil typically #6 oil in diesel engines. Some use a blend of both oils. Smaller diesels use distillate oil when maneuvering in port.

Emission estimates from vessels are developed using an activity factor which is the quantity and type of fuel and the appropriate emission factors. This method is applied to estimate emissions produced by fuel burned in a vessel boiler or engine either to move the vessel in port or provide power at dockside for onboard utilities (heat, lights, refrigeration, ventilation etc).

The following two sections cover the procedures for emission calculations from Commercial and Military vessels.

D.3-1 COMMERCIAL VESSELS

Commercial vessel emissions can be estimated by two available methods as presented in EPA Volume IV Mobile Sources.[6] The first method is based on quantity of fuel sold for marine use with assumptions to estimate the amount and type used in and around port in which an appropriate emission factor is applied. The second method is more complex and accurate in which emissions are estimated based on ship size and movement data for estimating fuel used by commercial vessels. The second method is utilized in this inventory.

SHIP MOVEMENT DATA METHOD

Underway Emissions

This method utilizes the number of vessels by size using the ports of Massachusetts and assumptions about dockside activity and ship movement in and out of the harbors. According to Volume IV, the draft size of the vessels is critical in that vessels greater than 18 ft generally use residual and distillate oil whereas those less than 18 ft use distillate oil only. Vessel data by draft size was obtained from the Army Corps of Engineers[1,2] "Trips and Drafts of Vessels.[11] This data includes all commercial vessels and those which service military agencies for 1989. The 1990 data should be available in the fall of 1992.

After obtaining the trips by draft size for each port in the state, the next step was to estimate the average travel time by vessels to and from each port. The travel time of vessels is estimated using the distance between the outer limits of the study area and the center of port activity. This distance is assumed to be 25 miles as was recommended in EPA's Emission Inventory Requirements for Post 1987 Ozone SIP's[11] for inventorying point sources outside the SIP analysis area. This distance is increased by 20% as recommended in Volume IV for maneuvering and leaving port and is divided by a given estimated average speed in port of 8 mph. This yields the estimated average underway travel time of each vessel using the port.

This is given by the equation in Volume IV as:

$t = (2.2d)/8 = 0.275d$,

where t = average travel time for vessels using the port, and

d = distance in statute miles between the outer limit of the port and the assumed centroid of port activity.

With the distance assumed to be 25 miles for each port, the average travel time was calculated at 6.875 hours.

Table 7-4 of Volume IV provides fuel consumption for vessels operating in port by vessel size and type. The two types are motor ships and steamships, in which most large American vessels are steampowered and most foreign vessels are diesel powered. In response to EPA's Comment #55 on the Draft '87 Inventory, this assumption was obtained from Volume IV p.7-11. The percentage of foreign and local ships was obtained from the Army Corps of Engineers[1] "Waterborne Commerce of the U.S."

As presented in Tables D.3-1 and D.3-2, the fuel usage is calculated for each type and size of ship for each port by utilizing the number of trips for each port, the fuel consumption rate in gallons per hour by size and type of ship, and the estimated hours of operation (6.875 hours). Once the fuel use associated with underway emissions has been computed, the emissions were calculated by applying the emission factors by size and type of ships as presented in Volume IV Table 7-5 (obtained from AP-42).[3] The following is an example of the VOC emissions calculation for the Port of Boston as show in Table D.3-1 and D.3-2.

Vessels Underway - Port of Boston

970 trips draft >18 ft. (Foreign = 534, Domestic = 437)

> 18 ft. = 534 (foreign) x 6.875 (hours) x 128 (gals/hour) =

534,820 gal x 50 lbs VOC/10^3 gal = 11.74 Tons VOC

> 18 ft. = 437 (Domestic) x 6.875 (hours) x 160 (gals/hour) =

480,150 gal x 0.7 lb VOC/10^3 gal = 0.17 Tons VOC

12-17 ft. = 6,541 (trips) x 6.875 (hours) x 44 (gals/hour) =

1,917,548 gal x 16.8 lb VOC/10^3 gal = 16.62 Tons VOC B.5-12)

6-11 ft. = 0 (trips) x 6.875 (hours) x 10 (gal/hour) =

0 gal x 44.5 lbs VOC/10^3 gal = 0.0 Tons VOC

1-5 ft. = 0 (trips) x 6.875 (hours) x 5 (gal/hour) = 168,197

0 gal x 51.1 lbs VOC/10^3 gal = 0.0 Tons VOC

Total emissions for vessels underway for the Port of Boston =

11.74 + 0.17 + 16.62 = 22.2 Tons VOC

Emissions for all the ports for commercial underway emissions are summarized and presented in Table D.3-3.

Dockside Emissions

Substantial emissions are produced when vessels, especially larger ones with draft over 18 ft are hotelling at dockside. For the larger vessels, auxiliary diesel generator system, or main boilers are operated to supply power for the vessels' utilities such as refrigeration, electricity, and ventilation. Boilers are rarely shut down at port because it takes a long time to restart and prepare them for operation. The average duration of stay at port is between 1 to 3 days and a default value of 3 days is used, as recommended in Volume IV.

Volume IV gives the fuel consumption rates for steamships at 1,900 gallons per day of residual oil and motor vessels at 660 gallons per day of distillate oil respectively. According to Volume IV p.7-11, the assumption is that all large American vessels are essentially steampowered and foreign vessels are powered by diesel engines (motorships). Fuel used by each type of vessel is calculated using the following formula:

$$Q_{ijk} = N_{ij} \times D_{ij} \times f_j$$

where Q_{ijk} = annual fuel consumption of fuel type k (residual or distillate) in area i, by type j vessels;

N_{ij} = number of type vessels (steamships or motorships) using the port;

D_{ij} = average duration of vessel type; in area i, an

f_j = fuel consumption rate for vessel type j

The dockside emission calculations are presented in Table D.3-6 for foreign motorships and domestic steamships for all ports. The fuel use for each vessel type is applied to the emission factors. The following is an example of the VOC emission calculation for the Port of Boston as shown in Table D.3-6:

Steamships (vessels >18 ft) = 437 (steamships) x 3 (days) x 1900 (gals residual/day) = 2,488.050 gals x 3.2 lbs VOC/10^3 gal = 3.98 Tons VOC.

Motorships 534 (motorships) x 3 (days) x 660 (gals residual/day) = 1,056,330 gals x 59 lbs VOC/10^3 gal = 31.16 Tons VOC.

Dockside emissions for the Port of Boston = 35.14. Tons VOC. Dockside and underway emissions for other ports in the state are pesented in Table D.3-5. Dockside vessels accounted for 121.44 Tons VOC, 832.96 Tons NOx and 78.56 Tons CO. Underway emissions amounted to 115.64 Tons VOC, 985.58 Tons NOx and 349.35 Tons CO.

Commercial vessels were adjusted for AMS input by estimating a composite emission factor per thousand gallon of fuel and are presented in Table D.3-11.

D.3-2 MILITARY VESSELS

Military vessels include trips made by the U.S. Navy and U.S. Coast Guard Vessels at several ports in Eastern Massachusetts. Commercial vessels serving the military stations in the state are covered under the 'Commercial Vessels' section. The Army Corps of Engineers[2] did not provide any data on military vessel activity in the state. Several military offices were contacted for military vessels activity.

The U.S. Coast Guard[12] was contacted and the office reported the use of 2 coast guard cutters making a total of 15 to 20 trips both in 1990. These trips are apportioned equally to Suffolk, Essex, Plymouth and Bristol Counties. These cutters are about 378 draft ft. and use diesel engines.

The Navy Yard in Charlestown[13] was contacted and the office reported about 45 visits were made by naval vessels from the Port of Boston in 1990. The Gloucester and Beverly harbors had one visit each.

The other major navy yard at New Bedford[14] was contacted and they reported only 2 visits of naval ships in 1990.

The total trips/visits made by military coast guard and naval vessels amounted to 69 trips. The amount of trips is very small, compared to commercial trips. Therefore, the emissions are very low or even negligible for military vessels. The following is the VOC emission calculation for military vessels:

Underway Emissions (Emission Factors-Volume IV T.7-2)

69 (trips) x 128 (gal/hr) x 6.875 (hrs) = 60,720 gals

x 50 lb VOC/10^3gal = 1.5 Tons VOC

x270 lb NOx/10^3gal = 8.2 Tons NOx

x110 lb CO/10^3gal = 3.3 Tons CO

Dockside Emissions (Emission Factors-Volume IV T.7-6)

69 (visits) x 3 (days) x 660 gals/dy = 136,620 gals

x 59 lbs VOC/10^3gal = 4.0 Tons VOC

x 364 lbs NOx/10^3gal = 24.9 Tons NOx

x 44 lbs CO/10^3gal = 3.0 Tons CO

Total emissions from Military Vessels for 1990 are: VOC 5.5 tons
NOx 33.1 tons
CO 6.3 tons

Military vessels were adjusted for AMS input by estimating a composite emission factor per thousand gallon of fuel and presented in Table D.3-12.

SUMMARY - VESSELS

Table D.3-5 and D.3-6 present the combined emissions for commercial vessels for underway and dockside by ports. For example, the total emissions for the Port of Boston for 1990 was 63.67 Tons VOC, 479.73 tons NOx and 111.44 tons CO. Commercial dockside and underway emissions were apportioned to counties based on location of ports and are presented in Tables D.3-5 and D.3-6.

The annual emissions were adjusted for a typical summer weekday. Commercial vessels are assumed to be uniform throughout the year at 6 days per week. Military vessels are assumed to be uniform throughout the year and week. Emissions are adjusted for the summer and winter (CO) and are presented in Tables D.3-7 to D.3-9.

The emissions for Commercial and Military Vessel emissions are presented for AMS data input in Tables D.3-10 and D.3-11.

The total gallons of fuel were applied to the emissions in order to get a composite emission factor in order to facilitate input into AMS.

The Emissions from all Vessels for 1990 was VOC - 242.59 TPY, or 0.775 TPSD, NO_x - 1,851.6 TPY or 5.92 TPSD, and CO - 434.2 TPY or 1.39 TPSD/TPWD.

TABLE D.3-1

COMMERCIAL VESSELS >18 FT EMISSIONS 1990

commves

			V >18FT	V >18FT	V >18FT	V >18FT	V >18FT	V >18FT	V >18FT	V >18FT	V >18FT	V >18FT	V >18FT
PORT	MOTOR FOREIGN%	STEAM DOMESTIC%	1989 >18FT TOT	MOTOR FOREIGN	STEAM DOMESTIC	FOREIGN FUEL CONS 128 G/HR *6.875HR	DOMESTIC FUEL C 160 G/HR *6.875HR	FOREIGN EMISS VOC EF 50LB/TG	FOREIGN EMISSION NOX EF 270LB/TG	FOREIGN EMISSION CO EF 110LB/TG	DOMESTIC EMISSION VOC EF .7LB/TG	DOMESTIC EMISSION NOX EF 55.8LB/TG	DOMESTIC EMISSION CO EF 3.5LB/TG
F.RIVER	0.06	0.94	279	17	262	14731	288486	0.37	1.99	0.81	0.10	8.05	0.50
N.BED/FAIR	0.13	0.87	47	6	41	5377	44979	0.13	0.73	0.30	0.02	1.25	0.08
NANTUCKET	0.00	1.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
FALMOUTH	0.00	1.00	7	0	7	0	7700	0.00	0.00	0.00	0.00	0.21	0.01
C.COD CANAL	0.17	0.83	790	134	656	118184	721270	2.95	15.95	6.50	0.25	20.12	1.26
PLYMOUTH H	0.00	1.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
TOWN RIVER	0.00	1.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
WEYMOUTH H	0.55	0.45	25	14	11	12100	12375	0.30	1.63	0.67	0.00	0.35	0.02
MYSTIC RIV	0.43	0.57	153	66	87	57895	95931	1.45	7.82	3.18	0.03	2.68	0.17
CHELSEA R	0.85	0.15	336	286	50	251328	55440	6.28	33.93	13.82	0.02	1.55	0.10
BOST.MAIN W	0.81	0.19	909	736	173	647935	189981	16.20	87.47	35.64	0.07	5.30	0.33
PORT OF BOST	0.55	0.45	970	534	437	469480	480150	11.74	63.38	25.82	0.17	13.40	0.84
SALEM HARB.	0.22	0.78	52	11	41	10067	44616	0.25	1.36	0.55	0.02	1.24	0.08
						TOTAL		39.68	214.26	87.29	0.68	54.15	3.40

TABLE D.3-2

COMMERCIAL VESSELS <18FT EMISSIONS

commves1

	12 - 17 FT					6 - 11 FT					1-5 FT							
PORT	12-17 FT	FUEL CONS 44G/HR *6.875HRS	VOC EMISS 16.8LB T.GAL	NOX EMISS 167.2 T.GAL	CO EMISS 62.2 T.GAL	6-11 FT	FUEL CONS 10G/HR *6.875HRS	VOC EMISS 44.5LB T.GAL	NOX EMISS 338.6 T.GAL	CO EMISS 99.7 T.GAL	1-5 FT	FUEL 5G/HR *6.875 HRS	VOC EMISS 51.1LB T.GAL	NOX EMISS 389.3 T.GAL	CO EMISS 47.3 T.GAL	TOTAL EMISS VOC TPY	TOTAL EMISS NOX TPY	TOTAL EMISS CO TPY
F.RIVER	0	0	0.00	0.00	0.00	1303	89581	1.99	15.17	4.47	0	0	0.00	0.00	0.00	1.99	15.17	4.47
N.BED/FAIR	48	14520	0.12	1.21	0.45	2751	189131	4.21	32.02	9.43	0	0	0.00	0.00	0.00	4.33	33.23	9.88
NANTUCKET	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00
FALM/WOODS H	1620	490050	4.12	40.97	15.24	4885	335844	7.47	56.86	16.74	30	1031	0.03	0.20	0.02	11.62	98.03	32.01
C.COD CANAL	2650	801625	6.73	67.02	24.93	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	6.73	67.02	24.93
VINEYARD H	5575	1686438	14.17	140.99	52.45	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	14.17	140.99	52.45
TOWN RIVER	9	2723	0.02	0.23	0.08	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.02	0.23	0.08
WEYMOUTH H	63	19058	0.16	1.59	0.59	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.16	1.59	0.59
MYSTIC RIV	332	100430	0.84	8.40	3.12	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.84	8.40	3.12
CHELSEA R	1033	312483	2.62	26.12	9.72	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	2.62	26.12	9.72
BOST.MAIN W	6339	1917548	16.11	160.31	59.64	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	16.11	160.31	59.64
PORT OF BOST	6541	1978653	16.62	165.42	61.54	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	16.62	165.42	61.54
SALEM HARB.	26	7865	0.07	0.66	0.24	0	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.07	0.66	0.24
		7331390	61.58	612.90	228.01		614556.2	13.67	104.04	30.64		1031.2	0.03	0.20	0.02	75.28	717.15	258.67

commves1

TABLE D.3-3

ALL COMMERCIAL VESSELS UNDERWAY EMISSIONS 1990

commves

PORT	V >18FT TOTAL EMISSION FOR & DOM VOC TPY	V <18FT TOTAL EMISSION FOR & DOM VOC TPY	ALL SIZ TOTAL VOC EMISS VOC TPY	V >18FT TOTAL EMISSION FOR & DOM NOX TPY	V <18FT TOTAL EMISSION FOR & DOM NOX TPY	ALL SIZ TOTAL NOX EMISS NOX TPY	V >18FT TOTAL EMISSION FOR & DOM CO TPY	V <18FT TOTAL EMISSION FOR & DOM CO TPY	ALL SIZ TOTAL CO EMISS CO TPY
F.RIVER	0.47	1.99	2.46	10.04	15.17	25.21	1.32	4.47	5.79
N.BED/FAIR	0.15	4.33	4.48	1.98	33.23	35.21	0.37	9.88	10.25
NANTUCKET	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FALMOUTH	0.00	11.62	11.62	0.21	98.03	98.24	0.01	32.01	32.02
C.COD CANAL	3.21	6.73	9.94	36.08	67.02	103.10	7.76	24.93	32.69
PLYMOUTH H	0.00	14.17	14.17	0.00	140.99	140.99	0.00	52.45	52.45
TOWN RIVER	0.00	0.02	0.02	0.00	0.23	0.23	0.00	0.08	0.08
WEYMOUTH H	0.31	0.16	0.47	1.98	1.59	3.57	0.69	0.59	1.28
MYSTIC RIV	1.48	0.84	2.32	10.49	8.40	18.89	3.35	3.12	6.47
CHELSEA R	6.30	2.62	8.92	35.48	26.12	61.60	13.92	9.72	23.64
BOST.MAIN W	16.26	16.11	32.37	92.77	160.31	253.08	35.97	59.64	95.61
PORT OF BOS	11.91	16.62	28.53	76.78	165.42	242.20	26.66	61.54	88.20
SALEM HARB.	0.27	0.07	0.34	2.60	0.66	3.26	0.63	0.24	0.87
TOTAL	40.36	75.28	115.64	268.41	717.17	985.58	90.69	258.67	349.36

commves

TABLE D.3-4

COMMERCIAL VESSELS >18 FT DOCKSIDE EMISSIONS 1990

cvesdock

				FOREIGN MOTORSHIPS DISTILLATE FUEL EMISSIONS					DOMESTIC STEAMSHIPS RESIDUAL FUEL EMISSIONS				
PORT	MOTOR FOREIGN %	STEAM DOMESTIC %	>18FT TOT	MOTOR FOREIGN DISTILL	FUEL FOREIGN DISTILL 660 G/DY	VOC EMISSION 59LB/TG VOC TPY	NOX EMISSION 364LB/TG NOX TPY	CO EMISSION 44LB/TG CO TPY	TOTAL STEAMSHP DOMESTIC RESIDUAL	FUEL STEAM DOMESTIC RESIDUAL 1900 G/DY	VOC EMISSION 3.2LB/TG VOC TPY	NOX EMISSION 36.4T/G NOX TPY	CO NEGLI-IBLE
========	=======	========	=========	========	========	=======	========	========	========	========	========	=======	======
F.RIVER	0.06	0.94	279	17	33145	0.98	6.03	0.73	262	1494882	2.39	27.21	
N.BED/FAIR	0.13	0.87	47	6	12098	0.36	2.20	0.27	41	233073	0.37	4.24	
NANTUCKET	0.00	1.00	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00	
FALM/WOODS.H	0.00	1.00	7	0	0	0.00	0.00	0.00	7	39900	0.06	0.73	
C.COD CANAL	0.17	0.83	790	134	265914	7.84	48.40	5.85	656	3737490	5.98	68.02	
PLYMOUTH H	0.00	1.00	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00	
TOWN RIVER	0.00	1.00	0	0	0	0.00	0.00	0.00	0	0	0.00	0.00	
WEYMOUTH H	0.55	0.45	25	14	27225	0.80	4.95	0.60	11	64125	0.10	1.17	
MYSTIC RIV	0.43	0.57	153	66	130264	3.84	23.71	2.87	87	497097	0.80	9.05	
CHELSEA R	0.85	0.15	336	286	565488	16.68	102.92	12.44	50	287280	0.46	5.23	
BOST.MAIN W	0.81	0.19	909	736	1457854	43.01	265.33	32.07	173	984447	1.58	17.92	
PORT OF BOST	0.55	0.45	970	534	1056330	31.16	192.25	23.24	437	2488050	3.98	45.28	
SALEM HARB.	0.22	0.78	52	11	22651	0.67	4.12	0.50	41	231192	0.37	4.21	
cvesdock		TOTAL	3568	1804	3570970	105.34	649.92	78.56	1764	10057536	16.09	183.05	

TABLE D.3-5

ALL COMMERCIAL VESSELS (MOTOR & STEAM) DOCKSIDE AND UNDERWAY EMISSIONS 1990

cvesdock

PORT	DOCKSIDE TOTAL EMISS VOC TPY	UNDERWAY TOTAL EMISS VOC TPY	TOTAL COMMERC EMISS VOC TPY	TOTAL COMMERCL EMISS WD VOC TPSD /52*6	DOCKSIDE TOTAL EMISS NOX TPY	UNDERW TOTAL EMISS NOX TPY	TOTAL COMMERCL EMISS NOX TPY	TOTAL COMMERCL EMISS WD NOX TPSD /52*6	DOCKSIDE TOTAL CO EMISS CO TPY	UNDERW TOTAL EMISS CO TPY	CO TOTAL COMMERCIAL EMISSIONS CO TPY	CO TOTAL COMMERCIAL EMISSIONS WD CO TPSD /52*6
========	=======	=========	=======	========	=========	=======	========	========	========	======	========	=========
F.RIVER	3.37	2.46	5.83	0.019	33.24	25.21	58.45	0.187	0.73	5.79	6.52	0.021
N.BED/FAIR	0.73	4.48	5.21	0.017	6.44	35.21	41.65	0.134	0.27	10.25	10.52	0.034
NANTUCKET	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.000
FALM/WOODS	0.06	11.62	11.68	0.037	0.73	98.24	98.97	0.317	0.00	32.02	32.02	0.103
C.COD CANA	13.82	9.94	23.76	0.076	116.42	103.10	219.52	0.704	5.85	32.69	38.54	0.124
PLYMOUTH H	0.00	14.17	14.17	0.045	0.00	140.99	140.99	0.452	0.00	52.45	52.45	0.168
TOWN RIVER	0.00	0.02	0.02	0.000	0.00	0.23	0.23	0.001	0.00	0.08	0.08	0.000
WEYMOUTH H	0.91	0.47	1.38	0.004	6.12	3.57	9.69	0.031	0.60	1.28	1.88	0.006
MYSTIC RIV	4.64	2.32	6.96	0.022	32.76	18.89	51.65	0.166	2.87	6.47	9.34	0.030
CHELSEA R	17.14	8.92	26.06	0.084	108.15	61.60	169.75	0.544	12.44	23.64	36.08	0.116
BOST.MAIN	44.58	32.37	76.95	0.247	283.25	253.08	536.33	1.719	32.07	95.61	127.68	0.409
PORT OF BO	35.14	28.53	63.67	0.204	237.53	242.20	479.73	1.538	23.24	88.20	111.44	0.357
SALEM HARB	1.04	0.34	1.38	0.004	8.33	3.26	11.59	0.037	0.50	0.87	1.37	0.004
cvesdock	121.44	115.64	237.08	0.760	832.96	985.58	1818.54	5.829	78.56	349.35	427.91	1.372
QC			237.08	0.760	832.96	985.58	1818.54	5.829	78.56	349.35	427.91	1.372

TABLE D.3-6

ALL COMMERCIAL VESSELS (MOTOR & STEAM) DOCKSIDE AND UNDERWAY EMISSIONS 1990

cvesCNTY

APPORTIONED TO COUNTIES

PORT		DOCKSIDE TOTAL EMISS VOC TPY	UNDERWAY TOTAL EMISS VOC TPY	TOTAL COMMERC EMISS VOC TPY	TOTAL COMMERCL EMISS VOC TPSD /52*6	DOCKSIDE TOTAL EMISS NOX TPY	UNDERW TOTAL EMISS NOX TPY	TOTAL COMMERCL EMISS NOX TPY	TOTAL COMMERCL EMISS NOX TPSD /52*6	DOCKSIDE TOTAL CO EMISS CO TPY	UNDERW TOTAL EMISS CO TPY	CO TOTAL COMMERCIAL EMISSIONS CO TPY	CO TOTAL COMMERCIAL EMISSIONS CO TPSD /52*6
F.RIVER	BRIST	3.37	2.46	5.83	0.019	33.24	25.21	58.45	0.187	0.73	5.79	6.52	0.021
N.BED/FAIR	BRIST	0.73	4.48	5.21	0.017	6.44	35.21	41.65	0.134	0.27	10.25	10.52	0.034
	TOTAL	4.10	6.94	11.04	0.035	39.68	60.42	100.10	0.321	1.00	16.04	17.04	0.055
NANTUCKET	NANT	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.000
FALM/WOODS.H	BARNST	0.06	11.62	11.68	0.037	0.73	98.24	98.97	0.317	0.00	32.02	32.02	0.103
C.COD CANAL	BARNST	13.82	9.94	23.76	0.076	116.42	103.10	219.52	0.704	5.85	32.69	38.54	0.124
	TOTAL	13.89	21.56	35.45	0.114	117.14	201.34	318.48	1.021	5.85	64.71	70.56	0.226
PLYMOUTH H	PLYM	0.00	14.17	14.17	0.045	0.00	140.99	140.99	0.452	0.00	52.45	52.45	0.168
TOWN RIVER	SUFF	0.00	0.02	0.02	0.000	0.00	0.23	0.23	0.001	0.00	0.08	0.08	0.000
WEYMOUTH H	NORF	0.91	0.47	1.38	0.004	6.12	3.57	9.69	0.031	0.60	1.28	1.88	0.006
MYSTIC RIV	SUFF	4.64	2.32	6.96	0.022	32.76	18.89	51.65	0.166	2.87	6.47	9.34	0.030
CHELSEA R	SUFF	17.14	8.92	26.06	0.084	108.15	61.60	169.75	0.544	12.44	23.64	36.08	0.116
BOST.MAIN W	SUFF	44.58	32.37	76.95	0.247	283.25	253.08	536.33	1.719	32.07	95.61	127.68	0.409
PORT OF BOS	SUFF	35.14	28.53	63.67	0.204	237.53	242.20	479.73	1.538	23.24	88.20	111.44	0.357
	TOTAL	101.504	72.16	173.66	0.557	661.68	576.00	1237.68	3.967	70.62	214.00	284.62	0.912
SALEM HARB.	ESSX	1.04	0.34	1.38	0.004	8.33	3.26	11.59	0.037	0.50	0.87	1.37	0.004
cvesdock		121.44	115.64	237.08	0.760 ****	832.96	985.58	1818.54	5.829	78.56	349.35	427.91	1.372

TABLE D.3-7

COMMERCIAL & MILITARY VESSELS VOC EMISSIONS 1990 **

11/9/93 REVISED
2vessum90

	COUNT	VOC COMMERC SHIPS VOC EM TPY	VOC COMMERC SHIPS VOC EM /52*6 TPSD	VOC MILIT SHIPS VOC EM TPY	VOC MILIT SHIPS VOC EM /365 TPSD	VOC COMMERC & MILIT VOC EM /365 TPSD	VOC TOTAL VESSELS VOC EM TPY	VOC TOTAL VESSELS VOC EM TPSD
1	BARNS	35.45	0.114	0	0.000	0.114	35.45	0.114
2	BERKS	0	0.000	0	0.000	0.000	0	0.000
3	BRIST	11.04	0.035	0.55	0.002	0.037	11.59	0.037
4	DUKES	0	0.000	0	0.000	0.000	0	0.000
5	ESSEX	1.38	0.004	0.55	0.002	0.006	1.93	0.006
6	FRANK	0	0.000	0	0.000	0.000	0	0.000
7	HAMPD	0	0.000	0	0.000	0.000	0	0.000
8	HAMPS	0	0.000	0	0.000	0.000	0	0.000
9	MIDDL	0	0.000	0	0.000	0.000	0	0.000
10	NANTU	0	0.000	0	0.000	0.000	0	0.000
11	NORFO	1.38	0.004	0	0.000	0.004	1.38	0.004
12	PLYMO	14.17	0.045	0.39	0.001	0.046	14.56	0.046
13	SUFFO	173.66	0.557	4.02	0.011	0.568	177.68	0.568
14	WORCE	0	0.000	0	0.000	0.000	0	0.000
	STATE	237.08	0.760	5.51	0.015	0.775	242.59	0.775
		237.080	0.760	5.510	0.015	0.775	242.59	0.775

** RECREATIONAL BOATING EMISSIONS ACCOUNTED FOR IN EPA NON-ROAD STUDY

TABLE D.3-8

COMMERCIAL & MILITARY VESSELS VOC EMISSIONS 1990 **

11/9/93 REVISED
2vessum90

COUNTIES	NOX COMMERC SHIPS NOX EM TPY	NOX COMMERC SHIPS NOX EM /52*6 TPSD	NOX MILIT SHIPS NOX EM TPY	NOX MILIT SHIPS NOX EM /365 TPSD	NOX COMMERC & MILIT NOX EM /365 TPSD	NOX TOTAL VESSELS NOX EM TPY	NOX TOTAL VESSELS NOX EM TPSD
BARNSTABL	318.48	1.021	0	0.000	1.021	318.48	1.021
BERKSHIRE	0	0.000	0	0.000	0.000	0	0.000
BRISTOL	100.1	0.321	3.31	0.009	0.330	103.41	0.330
DUKES	0	0.000	0	0.000	0.000	0	0.000
ESSEX	11.59	0.037	3.31	0.009	0.046	14.9	0.046
FRANKLIN	0	0.000	0	0.000	0.000	0	0.000
HAMPDEN	0	0.000	0	0.000	0.000	0	0.000
HAMPSHIRE	0	0.000	0	0.000	0.000	0	0.000
MIDDLESEX	0	0.000	0	0.000	0.000	0	0.000
NANTUCKET	0	0.000	0	0.000	0.000	0	0.000
NORFOLK	9.69	0.031	0	0.000	0.031	9.69	0.031
PLYMOUTH	140.99	0.452	2.32	0.006	0.458	143.31	0.458
SUFFOLK	1237.68	3.967	24.16	0.066	4.033	1261.84	4.033
WORCESTER	0	0.000	0	0.000	0.000	0	0.000
STATE	1818.53	5.829	33.10	0.091	5.919	1851.63	5.919
	1818.530	5.829	33.100	0.091	5.919	1851.6	5.919

**RECREATIONAL BOATING EMISSIONS ACCOUNTED FOR IN EPA NON-ROAD STUDY

TABLE D.3-9

COMMERCIAL & MILITARY VESSELS CO EMISSIONS 1990 **

vessum90

2vessum9 COUNTIES	CO COMMERC SHIPS CO EM TPY	CO COMMERC SHIPS CO EM /52*6 TPSD	CO MILIT SHIPS CO EM TPY	CO MILIT SHIPS CO EM TPSD/ TPWD	CO COMMERC & MILIT EMISS TPSD	CO TOTAL VESSELS CO EM TPY	CO TOTAL VESSELS CO EM TPSD/ TPWD
BARNSTABL	70.56	0.226	0	0.000	0.226	70.56	0.226
BERKSHIRE	0	0.000	0	0.000	0.000	0	0.000
BRISTOL	17.04	0.055	0.63	0.002	0.056	17.67	0.056
DUKES	0	0.000	0	0.000	0.000	0	0.000
ESSEX	1.37	0.004	0.63	0.002	0.006	2	0.006
FRANKLIN	0	0.000	0	0.000	0.000	0	0.000
HAMPDEN	0	0.000	0	0.000	0.000	0	0.000
HAMPSHIRE	0	0.000	0	0.000	0.000	0	0.000
MIDDLESEX	0	0.000	0	0.000	0.000	0	0.000
NANTUCKET	0	0.000	0	0.000	0.000	0	0.000
NORFOLK	1.88	0.006	0	0.000	0.006	1.88	0.006
PLYMOUTH	52.45	0.168	0.44	0.001	0.169	52.89	0.169
SUFFOLK	284.62	0.912	4.6	0.013	0.925	289.22	0.925
WORCESTER	0	0.000	0	0.000	0.000	0	0.000
STATE	427.92	1.372	6.30	0.017	1.389	434.22	1.389
	427.920	1.372	6.300	0.017	1.389	434.22	1.389

**RECREATIONAL BOATING EMISSIONS ACCOUNTED FOR IN EPA NON-ROAD STUDY

TABLE D.3-10

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                                      COMMERCIAL MARINE  VESSELS  EMISSIONS 1990
3shipams
 2/19/93
    SCC :      22-80-002-010  (USING A COMPOSITE EMISSION FACTOR AND RECORDING IT IN
                              THE COMMERCIAL MARINE DIESEL CATEGORY - IT INCLUDES RESIDUAL OIL)

    STATE ACTIVITY LEVEL :  **ESTIMATE BASED ON PRECALCULATED COMMERCIAL MARINE EMISSIONS
                              25,102.4  T.GALS
    COUNTY ACTIVITY LEVEL :       ANNUAL   OZ PO    CO PC      VOC TPY  VOC PO      NOX TPY  NOX PO       CO TPY  CO PO   CO PO  CO PO
    ---------------------       ACTIVITY   ACTIV  ACTIVITY     EM.FAC    TPSD      EM.FAC    TPSD        EM.FAC   TPSD  LB PSD   TPWD
    COUNTIES                     TH.GALS /312*78  /312*78  18.89LB/T.GL  /312  144.89LB/T.G   /78  34.094LB/TG   /78           /78
    ========                     ======= ======= =======   ======== ======    ======== ======     ======== =====  ====== ======
  1 BARNSTABLE             **     3753.5   938.4   938.4      35.45  0.114      271.92  0.872        63.99 0.205   410.2  0.205
  2 BERKSHIRE                        0.0     0.0     0.0       0.00  0.000        0.00  0.000         0.00 0.000     0.0  0.000
  3 BRISTOL                       1168.9   292.2   292.2      11.04  0.035       84.68  0.271        19.93 0.064   127.7  0.064
  4 DUKES                            0.0     0.0     0.0       0.00  0.000        0.00  0.000         0.00 0.000     0.0  0.000
  5 ESSEX                          146.1    36.5    36.5       1.38  0.004       10.59  0.034         2.49 0.008    16.0  0.008
  6 FRANKLIN                         0.0     0.0     0.0       0.00  0.000        0.00  0.000         0.00 0.000     0.0  0.000
  7 HAMPDEN                          0.0     0.0     0.0       0.00  0.000        0.00  0.000         0.00 0.000     0.0  0.000
  8 HAMPSHIRE                        0.0     0.0     0.0       0.00  0.000        0.00  0.000         0.00 0.000     0.0  0.000
  9 MIDDLESEX                        0.0     0.0     0.0       0.00  0.000        0.00  0.000         0.00 0.000     0.0  0.000
 10 NANTUCKET                        0.0     0.0     0.0       0.00  0.000        0.00  0.000         0.00 0.000     0.0  0.000
 11 NORFOLK                        146.1    36.5    36.5       1.38  0.004       10.59  0.034         2.49 0.008    16.0  0.008
 12 PLYMOUTH                      1500.4   375.1   375.1      14.17  0.045      108.69  0.348        25.58 0.082   164.0  0.082
 13 SUFFOLK                      18387.5  4596.9  4596.9     173.66  0.557     1332.07  4.269       313.45 1.005  2009.3  1.005
 14 WORCESTER                        0.0     0.0     0.0       0.00  0.000        0.00  0.000         0.00 0.000     0.0  0.000

    STATE                        25102.6  6275.6  6275.6     237.08  0.760     1818.54  5.829       427.92 1.372  2743.1  1.372

ACTIVITY LEVEL UNITS :         T.GALLONS                                                              ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :       BURNED                     NON-ATT   COUNTY       TOWN  COUNTY     %TOWN  ACTIV CO TPY   ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                     TOWNS               POPUL   POPUL     /CNTY T.GLS  34.094L   TONS  /78
                                                          =======  ======    ======== =======    ====== ====== ======= ====== ======
PEAK OZ DAYS/WEEK :            6                           BOSTON  SUFF25      574283  663906     86.5% 15905  271.14  3976.3  0.869
 WEEKS/YEAR :                  52        PO THRUPUT : 25 %  CAMBRIDGE  MIDX21   95802 1398468      6.9%     0    0.00     0.0  0.000
                                                           QUINCY  NORF23       84985  616087     13.8%    20    0.34     5.0  0.001
PEAK CO DAYS/WEEK :            6                          MEDFORD  MIDX21       57407 1398468      4.1%     0    0.00     0.0  0.000
WEEKS/YEAR :                   52        PC THRUPUT : 25 %  REVERE  SUFF25      42786  663906      6.4%  1185   20.20   296.2  0.065
                                                           MALDEN  MIDX21       53884 1398468      0.0%     0    0.00     0.0  0.000
EMISSION FACTORS :      VOC:   18.8889    (COMPOSITE      CHELSEA  SUFF25       28710  663906      4.3%   795   13.55   198.8  0.043
                        NOX:   144.889     EMISS. FACTORS)  EVERETT  MIDX21     35701 1398468      2.6%     0    0.00     0.0  0.000
                        CO:    34.094                   SOMERVILLE  MIDX21      76210 1398468      0.0%     0    0.00     0.0  0.000
EMISSION FACTOR UNITS :        LB/T.GAL   VOL.IV T7-1                                         TOTAL MET.BOSTON    305.24  4476.4  0.978
                                          AP-42 T.III-3-5,  WORCESTER  WORC26  169759  709705     23.9%     0    0.00     0.0  0.000
RULE EFFECTIVENESS :           N/A         II-4-1      SPRINGFIELD  HAMD19     156983  456310     34.4%     0    0.00     0.0  0.000
RULE PENETRATION :             N/A                         LOWELL  MIDX21      103439 1398468      7.4%     0    0.00     0.0  0.000
SIP RULE :                     NO                         WALTHAM  MIDX21       57878 1398468      4.1%     0    0.00     0.0  0.000

PO INTERVAL :                  1 HR
PC INTERVAL :                  8 HR

WEEKDAY:          72%        SAT : 14%        SUN :      14%

COMMENTS:      SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT NOV-JAN (FOR AMS)
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FEB 2 2 1993

TABLE D.3-11

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                              MILITARY VESSELS  EMISSIONS 1990
Mshipams

   SCC :      22-80-002-040  (USING A COMPOSITE EMISSION FACTOR AND RECORDING IT IN
                              THE MILITARY MARINE DIESEL CATEGORY - IT INCLUDES RESIDUAL OIL)

   STATE ACTIVITY LEVEL :     ESTIMATE BASED ON PRECALCULATED MILITARY EMISSIONS
                               196,340 T.GALS
   COUNTY ACTIVITY LEVEL :         ANNUAL    OZ PO    CO PC    VOC TPY  VOC PO     NOX TPY  NOX PO     CO TPY  CO PO   CO PO  CO PO
   ---------------------         ACTIVITY    ACTIV ACTIVITY     EM.FAC  LB PSD      EM.FAC  LB PSD     EM.FAC   TPSD  LB PSD LB PWD
   COUNTIES                       TH.GALS  /365*92  /365*92 56.127LB/T.G 365/92 337.17LB/T.G   /92 64.17LB/TGL   /92    /92    /92
   ========                       =======  =======  =======   ========  ======    ========  ======   ======== =====  ======  =====
 1 BARNSTABLE                         0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
 2 BERKSHIRE                          0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
 3 BRISTOL                           19.6      4.9      4.9       0.55     3.0        3.30      18       0.63 0.002     3.4    3.4
 4 DUKES                              0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
 5 ESSEX                             19.6      4.9      4.9       0.55     3.0        3.30      18       0.63 0.002     3.4    3.4
 6 FRANKLIN                           0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
 7 HAMPDEN                            0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
 8 HAMPSHIRE                          0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
 9 MIDDLESEX                          0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
10 NANTUCKET                          0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
11 NORFOLK                            0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0
12 PLYMOUTH                          13.9      3.5      3.5       0.39     2.1        2.34      13       0.45 0.001     2.4    2.4
13 SUFFOLK                          143.2     36.1     36.1       4.02    22.0       24.15     132       4.60 0.013    25.2   25.2
14 WORCESTER                          0.0      0.0      0.0       0.00     0.0        0.00       0       0.00 0.000     0.0    0.0

   STATE                            196.3     49.5     49.5       5.51    30.2       33.10     181       6.30 0.017    34.5   34.5

ACTIVITY LEVEL UNITS :        T.GALLONS                                                                ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                         NON-ATT    COUNTY      TOWN  COUNTY     %TOWN  ACTIV CO TPY    ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                        TOWNS               POPUL   POPUL     /CNTY T.GLS  64.17LB    TONS  /92
                                                             =======    ======  ======== =======    ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :           7                               BOSTON    SUFF25    574283  663906     86.5%   124    3.98    31.2 0.011
 WEEKS/YEAR :                 52          PO THRUPUT : 25 %  CAMBRIDGE  MIDX21     95802 1398468      6.9%     0    0.00     0.0 0.000
                                                              QUINCY    NORF23     84985  616087     13.8%     0    0.00     0.0 0.000
PEAK CO DAYS/WEEK :           7                              MEDFORD    MIDX21     57407 1398468      4.1%     0    0.00     0.0 0.000
WEEKS/YEAR :                  52          PC THRUPUT : 25 %    REVERE   SUFF25     42786  663906      6.4%     9    0.30     2.3 0.001
                                                              MALDEN    MIDX21     53884 1398468      0.0%     0    0.00     0.0 0.000
EMISSION FACTORS :     VOC:   56.127       (COMPOSITE        CHELSEA    SUFF25     28710  663906      4.3%     6    0.20     1.6 0.001
                       NOX:   337.17        EMISS. FACTORS)  EVERETT    MIDX21     35701 1398468      2.6%     0    0.00     0.0 0.000
                       CO:    64.17                        SOMERVILLE   MIDX21     76210 1398468      0.0%     0    0.00     0.0 0.000
EMISSION FACTOR UNITS :       LB/T.GAL    VOL.IV T7-1                                        TOTAL MET.BOSTON       4.47    35.1 0.012
                                          AP-42 T.III-3-5,   WORCESTER  WORC26    169759  709705     23.9%     0    0.00     0.0 0.000
RULE EFFECTIVENESS :          N/A          II-4-1          SPRINGFIELD  HAMD19    156983  456310     34.4%     0    0.00     0.0 0.000
RULE PENETRATION :            N/A                              LOWELL   MIDX21    103439 1398468      7.4%     0    0.00     0.0 0.000
SIP RULE :                    NO                              WALTHAM   MIDX21     57878 1398468      4.1%     0    0.00     0.0 0.000

PO INTERVAL :                 1 HR
PC INTERVAL :                 8 HR

WEEKDAY:         72%      SAT : 14%       SUN :       14%

COMMENTS:      SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT NOV-JAN (FOR AMS)
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TABLE D.3-10

```
                                              COMMERCIAL MARINE  VESSELS  EMISSIONS 1990
3shipams
 2/19/93
    SCC :       22-80-002-010  (USING A COMPOSITE EMISSION FACTOR AND RECORDING IT IN
                                THE COMMERCIAL MARINE DIESEL CATEGORY - IT INCLUDES RESIDUAL OIL)

    STATE ACTIVITY LEVEL :  **ESTIMATE BASED ON PRECALCULATED COMMERCIAL MARINE EMISSIONS
                              25,102.4  T.GALS
    COUNTY ACTIVITY LEVEL :       ANNUAL    OZ PO    CO PC      VOC TPY  VOC PO      NOX TPY  NOX PO      CO TPY  CO PO   CO PO   CO PO
    ---------------------       ACTIVITY    ACTIV  ACTIVITY      EM.FAC    TPSD       EM.FAC    TPSD      EM.FAC   TPSD  LB PSD    TPWD
    COUNTIES                     TH.GALS  /312*78  /312*78  18.89LB/T.GL   /312  144.89LB/T.G    /78  34.094LB/TG   /78             /78
    ========                     =======  =======  =======     ========  ======     ========  ======    ======== =====  ======  ======
  1 BARNSTABLE           **       3753.5    938.4    938.4        35.45   0.114       271.92   0.872       63.99 0.205   410.2   0.205
  2 BERKSHIRE                        0.0      0.0      0.0         0.00   0.000         0.00   0.000        0.00 0.000     0.0   0.000
  3 BRISTOL                       1168.9    292.2    292.2        11.04   0.035        84.68   0.271       19.93 0.064   127.7   0.064
  4 DUKES                            0.0      0.0      0.0         0.00   0.000         0.00   0.000        0.00 0.000     0.0   0.000
  5 ESSEX                          146.1     36.5     36.5         1.38   0.004        10.59   0.034        2.49 0.008    16.0   0.008
  6 FRANKLIN                         0.0      0.0      0.0         0.00   0.000         0.00   0.000        0.00 0.000     0.0   0.000
  7 HAMPDEN                          0.0      0.0      0.0         0.00   0.000         0.00   0.000        0.00 0.000     0.0   0.000
  8 HAMPSHIRE                        0.0      0.0      0.0         0.00   0.000         0.00   0.000        0.00 0.000     0.0   0.000
  9 MIDDLESEX                        0.0      0.0      0.0         0.00   0.000         0.00   0.000        0.00 0.000     0.0   0.000
 10 NANTUCKET                        0.0      0.0      0.0         0.00   0.000         0.00   0.000        0.00 0.000     0.0   0.000
 11 NORFOLK                        146.1     36.5     36.5         1.38   0.004        10.59   0.034        2.49 0.008    16.0   0.008
 12 PLYMOUTH                      1500.4    375.1    375.1        14.17   0.045       108.69   0.348       25.58 0.082   164.0   0.082
 13 SUFFOLK                      18387.5   4596.9   4596.9       173.66   0.557      1332.07   4.269      313.45 1.005  2009.3   1.005
 14 WORCESTER                        0.0      0.0      0.0         0.00   0.000         0.00   0.000        0.00 0.000     0.0   0.000

    STATE                        25102.6   6275.6   6275.6       237.08   0.760      1818.54   5.829      427.92 1.372  2743.1   1.372

ACTIVITY LEVEL UNITS :         T.GALLONS                                                                ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :       BURNED                      NON-ATT    COUNTY       TOWN  COUNTY      %TOWN  ACTIV CO TPY   ACTIV    TPWD
ACTIVITY LEVEL METHOD :                                      TOWNS                POPUL   POPUL      /CNTY T.GLS  34.094L   TONS   /78
                                                           =======    ======   ======== =======     ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :            6                            BOSTON    SUFF25     574283  663906      86.5% 15905  271.14  3976.3  0.869
 WEEKS/YEAR :                  52        PO THRUPUT : 25 %  CAMBRIDGE  MIDX21      95802 1398468       6.9%     0    0.00     0.0  0.000
                                                            QUINCY    NORF23      84985  616087      13.8%    20    0.34     5.0  0.001
PEAK CO DAYS/WEEK :            6                           MEDFORD    MIDX21      57407 1398468       4.1%     0    0.00     0.0  0.000
WEEKS/YEAR :                   52        PC THRUPUT : 25 %  REVERE    SUFF25      42786  663906       6.4%  1185   20.20   296.2  0.065
                                                            MALDEN    MIDX21      53884 1398468       0.0%     0    0.00     0.0  0.000
EMISSION FACTORS :      VOC:   18.8889    (COMPOSITE        CHELSEA   SUFF25      28710  663906       4.3%   795   13.55   198.8  0.043
                        NOX:   144.889     EMISS. FACTORS)  EVERETT   MIDX21      35701 1398468       2.6%     0    0.00     0.0  0.000
                        CO:    34.094                      SOMERVILLE MIDX21      76210 1398468       0.0%     0    0.00     0.0  0.000
EMISSION FACTOR UNITS :        LB/T.GAL   VOL.IV T7-1                                          TOTAL MET.BOSTON   305.24  4476.4  0.978
                                          AP-42 T.III-3-5,  WORCESTER  WORC26     169759  709705      23.9%     0    0.00     0.0  0.000
RULE EFFECTIVENESS :           N/A         II-4-1        SPRINGFIELD  HAMD19     156983  456310      34.4%     0    0.00     0.0  0.000
RULE PENETRATION :             N/A                           LOWELL   MIDX21     103439 1398468       7.4%     0    0.00     0.0  0.000
SIP RULE :                     NO                           WALTHAM   MIDX21      57878 1398468       4.1%     0    0.00     0.0  0.000

PO INTERVAL :                  1 HR
PC INTERVAL :                  8 HR

WEEKDAY:         72%      SAT : 14%      SUN :      14%

COMMENTS:      SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT NOV-JAN (FOR AMS)
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FEB 2 2 199

TABLE D.3-11

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                                  MILITARY VESSELS  EMISSIONS 1990
Mshipams

   SCC :      22-80-002-040  (USING A COMPOSITE EMISSION FACTOR AND RECORDING IT IN
                              THE MILITARY MARINE DIESEL CATEGORY - IT INCLUDES RESIDUAL OIL)

   STATE ACTIVITY LEVEL :     ESTIMATE BASED ON PRECALCULATED MILITARY EMISSIONS
                               196,340 T.GALS
   COUNTY ACTIVITY LEVEL :       ANNUAL    OZ PO    CO PC      VOC TPY  VOC PO     NOX TPY  NOX PO      CO TPY  CO PO   CO PO  CO PO
   ---------------------       ACTIVITY    ACTIV  ACTIVITY      EM.FAC  LB PSD      EM.FAC  LB PSD      EM.FAC   TPSD  LB PSD LB PWD
   COUNTIES                     TH.GALS  /365*92  /365*92  56.127LB/T.G 365/92 337.17LB/T.G   /92  64.17LB/TGL   /92     /92    /92
   ========                     =======  =======  =======     ========  ======    ========  ======    ======== =====  ====== =====
 1 BARNSTABLE                      0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
 2 BERKSHIRE                       0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
 3 BRISTOL                        19.6      4.9      4.9         0.55     3.0        3.30     18        0.63 0.002     3.4    3.4
 4 DUKES                           0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
 5 ESSEX                          19.6      4.9      4.9         0.55     3.0        3.30     18        0.63 0.002     3.4    3.4
 6 FRANKLIN                        0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
 7 HAMPDEN                         0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
 8 HAMPSHIRE                       0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
 9 MIDDLESEX                       0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
10 NANTUCKET                       0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
11 NORFOLK                         0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0
12 PLYMOUTH                       13.9      3.5      3.5         0.39     2.1        2.34     13        0.45 0.001     2.4    2.4
13 SUFFOLK                       143.2     36.1     36.1         4.02    22.0       24.15    132        4.60 0.013    25.2   25.2
14 WORCESTER                       0.0      0.0      0.0         0.00     0.0        0.00      0        0.00 0.000     0.0    0.0

   STATE                         196.3     49.5     49.5         5.51    30.2       33.10    181        6.30 0.017    34.5   34.5

ACTIVITY LEVEL UNITS :        T.GALLONS                                                                  ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                           NON-ATT   COUNTY       TOWN  COUNTY    %TOWN  ACTIV CO TPY   ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                          TOWNS                POPUL   POPUL    /CNTY T.GLS  64.17LB   TONS  /92
                                                               =======   ======   ======== =======   ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :           7                                 BOSTON   SUFF25     574283  663906    86.5%   124    3.98    31.2  0.011
 WEEKS/YEAR :                 52        PO THRUPUT : 25 %    CAMBRIDGE   MIDX21      95802 1398468     6.9%     0    0.00     0.0  0.000
                                                                QUINCY   NORF23      84985  616087    13.8%     0    0.00     0.0  0.000
PEAK CO DAYS/WEEK :           7                                MEDFORD   MIDX21      57407 1398468     4.1%     0    0.00     0.0  0.000
WEEKS/YEAR :                  52        PC THRUPUT : 25 %       REVERE   SUFF25      42786  663906     6.4%     9    0.30     2.3  0.001
                                                                MALDEN   MIDX21      53884 1398468     0.0%     0    0.00     0.0  0.000
EMISSION FACTORS :    VOC:   56.127      (COMPOSITE            CHELSEA   SUFF25      28710  663906     4.3%     6    0.20     1.6  0.001
                      NOX:   337.17       EMISS. FACTORS)      EVERETT   MIDX21      35701 1398468     2.6%     0    0.00     0.0  0.000
                      CO:    64.17                          SOMERVILLE   MIDX21      76210 1398468     0.0%     0    0.00     0.0  0.000
EMISSION FACTOR UNITS :       LB/T.GAL  VOL.IV T7-1                                            TOTAL MET.BOSTON    4.47    35.1  0.012
                                        AP-42 T.III-3-5,     WORCESTER   WORC26     169759  709705    23.9%     0    0.00     0.0  0.000
RULE EFFECTIVENESS :          N/A        II-4-1            SPRINGFIELD   HAMD19     156983  456310    34.4%     0    0.00     0.0  0.000
RULE PENETRATION :            N/A                               LOWELL   MIDX21     103439 1398468     7.4%     0    0.00     0.0  0.000
SIP RULE :                    NO                               WALTHAM   MIDX21      57878 1398468     4.1%     0    0.00     0.0  0.000

PO INTERVAL :                 1 HR
PC INTERVAL :                 8 HR

WEEKDAY:        72%      SAT : 14%      SUN :      14%

COMMENTS:     SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT NOV-JAN (FOR AMS)
```

REFERENCES FOR VESSELS

1) Army Corps of Engineers "Waterborne Commerce of the United States, 1989 and 1987. Part 1. Waterways and Harbors" Atlantic Coast. Dept. of US Army. Water Resources Support Center, Navigation Division. N. Orleans. June 1991.

2) Army Corps of Engineers "Waterborne Commerce Statistics Center Atlantic Region Freight Traffic Tables, Trips and Drafts Advanced 1987 Report." New Orleans La. July 1989.

3) Coastal Zone Management. Executive Office of Environmental Affairs. Coast Line Mileage Estimate by Steve Bliven. July 1988.

4) DEP - Division of Wetlands and Waterways. Methodology to estimate miles of waterways in Massachusetts. 1970-1975.

5) EPA "Compilation of Air Pollutant Emission Factors. Volume II: Mobile Sources. 4th Ed. Office of Air and Radiation, Office of Mobile Sources. Ann Arbor MI. September 1985, and Supplement A January 1991.

6) EPA "Procedures for Emission Inventory Preparation Volume V: Mobile Sources". OAQPS and ECTD Division of Mobile Sources (Revised). July 1989.

7) Massachusetts House Bill 1300. Report to the Special Commission Directed to Study the Use of Certain Lands and Waters in the Commonwealth for Recreational purposes. December 6, 1933.

8) Massachusetts Port Authority - Maritime Information System Specialist - Paula Mahan,Data on Fishing Boat Docking at Massport Fishing Pier. July 1988.

9) Massachusetts Registry of Motor Vehicles, Division of Law Enforcement. "Report of Certificates of Number Issued to the Public" 1987. Division of Licenses - Boston Mass. July 1988. Telephone interview with Linda Williams April 8, 1992 for 1990 update.

10) National Climatic Data Center "Local Climatological Data (LCD), Monthly Summary for Logan Airport and Worcester Airport." US Department of Commerce 1990.

11) EPA "Emission Inventory Requirements for Ozone State Implementation Plans." OAQPS RTP NC. EPA 450/4-91-010, March 1991.

12) U.S. Coast Guard; U.S. Department of Transportation. Telephone Interview with Greg Creedon, Public Affairs Office. August 15th 1989, March 10, 1992 for 1990 Update.

13) U.S. Navy, Charlestown Navy Yard, Naval Detachment Office. Telephone Interview with Scott Cavanaugh August 15th 1989, March 1992 for 1990 Update.

14) U.S. Navy, New Bedford Navy Yard. Telephone Interview with Ken Russman on Naval Trip Activity. August 17th 1989, March 1992 for 1992 Update.

15) EPA's Comments on 1990 Draft Emissions Inventory, September 1992.

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D.4 OFF-HIGHWAY VEHICLES - EPA NON-ROAD STUDY EMISSIONS

The original emissions estimate for off-highway vehicles using EPA's Volume IV methodology and submitted in the Draft 1990 Emissions Inventory is now superseded by emissions estimates from EPA's Non-Road Engine Study. This study is entitled "Non-Road Engine Emission Inventories for CO and Ozone Non-Attainment Boundaries Boston, Lawrence, Worcester and Springfield," prepared for US EPA OMS Ann Arbor Michigan by Energy and Environmental Analysis, Inc. Arlington Virginia. (Received by DEP October 8 1992). These emission estimates from this study were received in hard copy and electronic format. The electronic data in Lotus 123 files were accessed and the accompanying instructional memorandum were utilized for summarizing the data by counties. County VOC, NO_x and CO emissions were summarized for 78 equipment types including 2 stroke, 4 stroke and Diesel engines.

DEP's ADJUSTMENT TO THE NON-ROAD STUDY EMISSIONS

EPA's nonroad equipment study excluded certain types of emissions from nonroad (aka off-road) engines, specifically 'hot soak evaporative' emissions and 'running loss' emissions. These types of emissions were excluded because there was no available data to estimate them, although EPA acknowledged that such emissions exist and may be significant.

In an EPA guidance memorandum from Phil Lorang of August 18, 1993, concerning emissions credits from federal reformulated gasoline in nonroad engines, EPA states:

> Hot soak and running loss emissions are likely to be a component of nonroad evaporative emissions, and would be affected to some degree and would be affected to some degree by RVP reductions in reformulated gasoline...The very obvious differences between highway vehicles and non-road equipment with respect to physical features which can affect hot soak and running loss emission levels and their response to RVP changes gave no rational basis for the inclusion of any specific estimate of hot soak and running loss emissions in the AMS inventories based on motor vehicles.

The Department believes that, although there are indeed significant physical and operational differences between motor vehicles and nonroad equipment, not including these real emissions in the 1990 Base Year inventory is incorrect.

The Department will include hot soak and running loss emissions in the Massachusetts 1990 Base Year inventory. This will be done by adjusting EPA's VOC emission numbers from gasoline-powered nonroad equipment (both 2 and 4 stoke engines) upward by a factor of **1.52**. The derivation of this adjustment factor is explained below.

There are no studies on hot soak and running loss emissions from nonroad engines, even though the Department acknowledges the differences between on and off road vehicles, the Department will assume that pre-1970 cars and nonroad engines have similar proportions of hot soak and running loss emissions. Using Mobile5a with national default settings, 9.0 RVP and 19.6 mph, and assuming that 45% of the total evaporative emissions derive from hot soak emissions, the Department calculated that hot soak and running losses account for 34% of all pre-1970 light-duty gas vehicle VOC emissions. The Department will assume that nonroad engines share this same percentage, although it is more likely, given the proximity of the gasoline tank and the hot engine, that nonroad engines would have a higher percentage. With these assumptions, the EPA nonroad inventory represents only 66% of the actual nonroad emissions in 1990, in order to derive the real inventory EPA numbers must be multiplied by 1.52 (1/0.66=1.52).

Emissions from this study for the state were estimated at 291.74 TPSD for VOC, 153.59 TPSD for NO_x, 1,337.17 TPSD and 91.85 TPWD for CO. These emissions are summarized in Table D.4-1.

EPA contractor, Radian Corporation, is currently uploading electronically these emissions into AIRS-AMS.

Total emissions for the Non-Road Mobile Source category amounted to ****** TPSD for VOC, 175.5 TPSD for NO_x, 1,368.6 TPSD for CO and 123.3 TPWD for CO. Non-Road Mobile summary emissions are presented by counties in Table D.4-2 to D.4-4

NONROAD

engines share this same percentage, although it is more likely, given the proximity of the gasoline tank and the hot engine, that nonroad engines would have a higher percentage. With these assumptions, the EPA nonroad inventory represents only 66% of the actual nonroad emissions in 1990, in order to derive the real inventory EPA numbers must be multiplied by 1.52 (1/0.66=1.52).

Emissions from this study for the state were estimated at 291.74 TPSD for VOC, 153.59 TPSD for NO_x, 1,337.17 TPSD and 91.85 TPWD for CO. These emissions are summarized in Table D.4-1 and the documentation for the study is presented at the end of this section.

EPA contractor, Radian Corporation, has uploaded electronically these emissions into AIRS-AMS and the 1.52 adjustment for VOC is still to be done.

SUMMARY TOTAL NON-ROAD EMISSIONS

Total emissions for the Non-Road Mobile Source category amounted to 298.135 TPSD for VOC, 176.18 TPSD for NO_x, 1,354.68 TPSD for CO and 109.36 TPWD for CO. Non-Road Mobile summary emissions are presented by counties in Table D.4-2 to D.4-4

TABLE D.4-1

EPA-OMS NON-ROAD STUDY EMISSIONS December 23,1992

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		1.52					*1.52											
	VOCs	VOCs	NOXs	COw	COs	VOCs	VOCs	NOXs	COw	COs	VOCs	NOXs	COw	COs				
COUNTIES	4AB	4AB	4AB	4AB	4AB	2AB	2AB	2AB	2AB	2AB	DAB	DAB	DAB	DAB	TOTAL	TOTAL	TOTAL	TOTAL
	4CYCLE	4CYCLE	4CYCLE	4CYCLE	4CYCLE	2CYCLE	2CYCLE	2CYCLE	2CYCLE	2CYCLE	DIESEL	DIESEL	DIESEL	DIESEL	VOC SUM	NOX SUM	CO SUM	CO WIN
	-----	------				------	------								=========	========	========	========
Barnstable	8.06	12.25	1.58	0.00	94.52	14.97	22.75	0.13	0.00	28.75	0.56	4.72	0.00	2.64	35.57	6.43	125.91	0.00
Berkshire	1.98	3.01	0.16	0.00	24.92	3.09	4.70	0.09	0.00	6.47	0.46	3.41	0.00	2.03	8.17	3.66	33.42	0.00
Bristol	4.83	7.34	0.55	0.00	67.95	6.43	9.77	0.32	0.00	13.98	1.34	10.34	0.00	6.08	18.46	11.21	88.01	0.00
Dukes	0.86	1.31	0.21	0.00	9.68	1.77	2.69	0.02	0.00	3.31	0.08	0.73	0.00	0.40	4.08	0.96	13.39	0.00
Essex	8.10	12.31	1.04	0.00	112.53	10.79	16.40	0.62	0.00	23.28	1.65	12.91	0.00	7.42	30.36	14.57	143.23	0.00
Franklin	1.49	2.26	0.19	0.00	17.00	3.01	4.58	0.04	0.00	5.92	0.24	1.68	0.00	1.06	7.08	1.91	23.98	0.00
Hampden	5.30	8.06	0.55	7.57	71.17	7.05	10.72	0.39	1.10	15.56	0.87	6.78	0.35	3.80	19.64	7.72	90.53	9.02
Hampshire	1.66	2.52	0.14	0.00	20.97	3.05	4.64	0.06	0.00	6.01	0.41	2.95	0.00	1.86	7.57	3.15	28.84	0.00
Middlesex	16.62	25.26	2.07	20.25	247.30	19.81	30.11	1.40	2.76	45.30	4.38	34.46	1.26	19.81	59.75	37.93	312.41	24.27
Nantucket	1.05	1.60	0.24	0.00	11.87	1.99	3.02	0.02	0.00	3.79	0.05	0.46	0.00	0.23	4.67	0.72	15.89	0.00
Norfolk	7.52	11.43	0.82	5.42	110.16	9.32	14.17	0.40	0.62	19.36	1.90	15.10	0.28	8.71	27.50	16.32	138.23	6.32
Plymouth	6.35	9.65	0.71	0.00	83.34	9.96	15.14	0.18	0.00	19.69	1.16	8.96	0.00	5.31	25.95	9.85	108.34	0.00
Suffolk	3.96	6.02	0.56	35.46	66.13	3.84	5.84	0.33	3.17	9.05	2.37	19.49	4.85	10.15	14.23	20.38	85.33	43.48
Worcester	7.07	10.75	0.75	7.18	97.76	10.29	15.64	0.38	0.94	21.51	2.34	17.65	0.64	10.39	28.73	18.78	129.66	8.76
STATE TOTA	74.85	113.77	9.57	75.88	1035.3	105.37	160.16	4.38	8.59	221.98	17.81	139.64	7.38	79.89	291.74	153.59	1337.17	91.85
	TPSD	TPSD	TPSD	TPWD	TPSD	TPSD		TPSD	TPWD	TPSD	TPSD	TPSD	TPWD	TPSD	TPSD	TPSD	TPSD	TPWD
															291.7444			

SOURCE: Final EEA Non-Road Study (Oct-'92) Boston/Springfield

Note 1: VOC/NOX/CO Emission Inventory Inventory (A+B)/2 (TPSD/TPWD) OMS Memo: April '92

Note 2: County VOC/NOX/CO Emissions are for 79 equipment types including 2stroke, 4 stroke and Diesel Engines. Emissions from Inboard and Outboard engines are included.These emissions have been loaded into AIRS-AMS

Note 3: Radian Corporation personnel have uploaded the Non-Road Inventory Data into the AIRS-AMS System

Note 4 :* VOC 4-CYCLE AND 2-CYCLE ENGINES WERE ADJUSTED BY 1.52 TO ACCOUNT FOR HOT SOAK EVAPORATIVE AND RUNNING LOSS EMISSIONS

TABLE D.4-2

(TABLE I-11)

NON-ROAD MOBILE SOURCE VOC EMISSIONS 1990 TPY AND TPSD BY COUNTY

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	COUNTIES	AIRCRAFT TPSD	RAILROAD TPY	RAIL TPSD	COMMERC & MILIT VESSELS TPSD	EPA-OMS* NON-ROAD STUDY EM TPSD	TOTAL NON-ROAD EMISS VOC TPSD
1	BARNSTABLE	0.339	8.13	0.022	0.114	35.566	36.041
2	BERKSHIRE	0.000	18.07	0.049	0.000	8.166	8.215
3	BRISTOL	0.000	14.27	0.039	0.037	18.455	18.531
4	DUKES	0.191	0.00	0.000	0.000	4.078	4.269
5	ESSEX	0.234	19.87	0.054	0.006	30.363	30.657
6	FRANKLIN	0.000	17.52	0.048	0.000	7.080	7.128
7	HAMPDEN	0.322	19.33	0.053	0.000	19.642	20.017
8	HAMPSHIRE	0.000	8.85	0.024	0.000	7.569	7.593
9	MIDDLESEX	0.122	24.93	0.068	0.000	59.754	59.944
10	NANTUCKET	0.225	0.00	0.000	0.000	4.671	4.896
11	NORFOLK	0.054	18.07	0.049	0.004	27.497	27.604
12	PLYMOUTH	0.000	12.47	0.034	0.046	25.951	26.031
13	SUFFOLK	3.517	9.94	0.027	0.568	14.226	18.338
14	WORCESTER	0.038	38.66	0.106	0.000	28.727	28.871
	STATE	5.042	210.11	0.573	0.775	291.745	298.135 298.135

* TAKEN FROM EPA'S NON-ROAD ENGINE STUDY

TABLE D.4-3

(TABLE I-12)

NON-ROAD MOBILE SOURCE NOX EMISSIONS 1990 TPY AND TPSD BY C

NOV 7 93
4nroadnox

	COUNTIES	1 AICRFT TPSD	2 RAILROAD TPY	2 RAIL TPSD	3 COMMERC & MILIT VESSELS	4 * EPA-NON ROAD STUDY TPSD	TOTAL NONROAD EMISS NOX TPSD
	=========	=====	=====	=====	=====	=======	========
1	BARNSTABLE	0.148	150.33	0.412	1.021	6.43	8.011
2	BERKSHIRE	0.000	334.07	0.915	0.000	3.66	4.575
3	BRISTOL	0.000	263.92	0.723	0.330	11.21	12.263
4	DUKES	0.080	0.00	0.000	0.000	0.96	1.040
5	ESSEX	0.045	367.48	1.007	0.046	14.57	15.668
6	FRANKLIN	0.000	324.05	0.888	0.000	1.91	2.798
7	HAMPDEN	0.234	357.46	0.979	0.000	7.72	8.933
8	HAMPSHIRE	0.000	163.70	0.448	0.000	3.15	3.598
9	MIDDLESEX	0.032	461.02	1.263	0.000	37.93	39.225
10	NANTUCKET	0.051	0.00	0.000	0.000	0.72	0.771
11	NORFOLK	0.008	334.07	0.915	0.031	16.32	17.274
12	PLYMOUTH	0.000	230.51	0.632	0.458	9.85	10.940
13	SUFFOLK	5.411	183.74	0.503	4.033	20.38	30.327
14	WORCESTER	0.020	714.91	1.959	0.000	18.78	20.759
	STATE	6.029	3885.26	10.645	5.919	153.59	176.183
			3885.26	10.645	5.919	153.59	176.183

* TAKEN FROM EPA'S NON-ROAD STUDY

TABLE D.4-4

(TABLE I-13)

NON-ROAD MOBILE SOURCE CO EMISSIONS 1990 TONS PER YEAR (TPY), SUMMER, AND WIN

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	COUNTIES	1 AICRFT TPSD TPWD	2 RAILROAD TPY	2 RAIL TPSD& TPWD	3 COMMERC & MILIT VESSELS	4 * OFFHW STUDY TPSD	4 OFFHW VEHIC TPWD	TOTAL NONROAD EMISS CO TPSD	TOTAL NONROAD EMISS CO TPWD
1	BARNSTABLE	0.823	20.57	0.056	0.226	125.91	0.00	127.015	1.105
2	BERKSHIRE	0.000	45.71	0.125	0.000	33.42	0.00	33.545	0.125
3	BRISTOL	0.000	36.11	0.099	0.056	88.01	0.00	88.165	0.155
4	DUKES	1.073	0.00	0.000	0.000	13.39	0.00	14.463	1.073
5	ESSEX	0.841	50.28	0.138	0.006	143.23	0.00	144.215	0.985
6	FRANKLIN	0.000	44.34	0.121	0.000	23.98	0.00	24.101	0.121
7	HAMPDEN	1.007	48.91	0.134	0.000	90.53	9.02	91.671	10.161
8	HAMPSHIRE	0.000	22.40	0.061	0.000	28.84	0.00	28.901	0.061
9	MIDDLESEX	0.304	63.08	0.173	0.000	312.41	24.27	312.887	24.747
10	NANTUCKET	0.579	0.00	0.000	0.000	15.89	0.00	16.469	0.579
11	NORFOLK	0.398	45.71	0.125	0.006	138.23	6.32	138.759	6.849
12	PLYMOUTH	0.000	31.54	0.086	0.169	108.34	0.00	108.595	0.255
13	SUFFOLK	9.451	25.14	0.069	0.925	85.33	43.48	95.775	53.925
14	WORCESTER	0.188	97.82	0.268	0.000	129.66	8.76	130.116	9.216
	STATE	14.66	531.61	1.456	1.388	1337.17	91.85	1354.678	109.358
			531.61	1.456	1.388	1337.17	91.85	1354.678	

* TAKEN FROM EPA'S NON ROAD STUDY

Rec'd
8 oct 92

NONROAD ENGINE EMISSION INVENTORIES FOR CO AND OZONE NONATTAINMENT BOUNDARIES
BOSTON-LAWRENCE-WORCESTER

Prepared for:
U.S. Environmental Protection Agency
Ann Arbor, Michigan

Prepared by:
Energy and Environmental Analysis, Inc.
Arlington, Virginia

FEB 2 2 1993

NONROAD ENGINE EMISSION INVENTORIES FOR CO AND OZONE NONATTAINMENT BOUNDARIES SPRINGFIELD NECMA

Prepared for:
U.S. Environmental Protection Agency
Ann Arbor, Michigan

Prepared by:
Energy and Environmental Analysis, Inc.
Arlington, Virginia

D.4-9

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NOTES TO INVENTORY PREPARERS ON NONROAD SMAPLE TEXT

The text presented here is a template for documenting SIP base year inventories for the nonroad mobile source categories which have been prepared by the Office of Mobile Sources (OMS). The nonroad mobile sources that have been inventoried for the states are: recreational vehicles, construction, industrial, lawn and garden, farm, light commercial, logging, and airport service equipment, and recreational vessels. This guidance is appropriate for use when:

- *The nonroad inventory prepared by OMS has been used for the base year inventory without changes (version A of the documentation);*
- *A surrogate nonroad inventory prepared by OMS has been apportioned to the target county for the base year inventory by using the guidance from EIB (version B).*

Changes to the methodology or deletions to the inventory should be clearly documented.

Italicized comments in the document text are not meant to remain in the finished document, but are there to explain how to tailor the sample document to a specific area.

OTHER NON-ROAD ENGINES AND VEHICLES *(Version A)*

1.0 INTRODUCTION

The "Other Non-road Engines and Vehicles" category includes a diverse collection of equipment ranging from lawn mowers and chain saws, to recreational equipment, to farm equipment and construction machinery. The EPA conducted a study (completed in November 1991) of emissions from non-road engines and vehicles[1] to determine whether emissions from such sources cause, or significantly contribute to air pollution that may be reasonably anticipated to endanger public health or welfare.

2.0 METHODS

As part of the above study, EPA considered more than 80 different types of equipment. To facilitate analysis and reporting, EPA grouped the equipment types into the 10 equipment categories listed below:

- Lawn and Garden Equipment,
- Agricultural Equipment,
- Logging Equipment,
- Light Commercial Equipment,
- Industrial Equipment,
- Construction Equipment,
- Airport Service Equipment,
- Recreational Equipment,
- Recreational Marine Equipment, and
- Commercial Marine Vessels.[a]

Two emission inventories were developed for the first nine categories for 24 ozone and CO nonattainment areas across the country.

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[a] In this inventory, Commercial Marine Vessels is treated and discussed as a separate category.

The EPA then contracted with Energy and Environmental Analysis, Inc., (EEA) to update the non-road equipment and vehicle emission inventories based on the 1991 EPA-designated nonattainment boundaries for CO and ozone exceedance areas. These areas include the original 24 areas from the original non-road study and an additional nine areas. The 33 nonattainment areas all have had an inventory, designated as "Inventory A," prepared for them, based on commercially and publicly available data. In addition to Inventory A, the original 24 areas have been provided with two more inventories. The second inventory, designated as "Inventory B," is based on confidential, industry-supplied sales and other data that are not publicly available. The second inventory provided EPA with a cross-check for the first inventory, and the results agreed reasonably well. The third inventory is an average of both inventories and is designated "Inventory (A+B)/2." Thus, for the original 24 inventory areas, inventory preparers use Inventory (A+B)/2, and for the remaining 9 inventory areas, only Inventory A is provided, and only Inventory A can be used.

The following is a brief description of the procedures that were followed by the EEA in preparing the non-road emissions data that are being used for this inventory.

To construct the EPA non-road inventory, several factors were estimated: (1) equipment populations in the given nonattainment area; (2) annual hours of use of each type of equipment, adjusted for geographic region and for the season of interest for each pollutant studied; (3) average rated horsepower of each type of equipment; (4) typical load factor for each type of equipment; and (5) an emission factor for each of the 79 categories of equipment. In developing emissions inventories for non-road engines and vehicles, the EPA used the following formula to calculate emissions for most of the 79 non-road categories:

$$M_i = N \times HRS \times HP \times LF \times EF_i$$

where:

M_i = mass of emissions of i^{th} pollutant during inventory period

N = source population

HRS = annual hours of use

HP = average rated horsepower

LF = typical load factor

EF_i = average emissions of i^{th} pollutant per unit of use (e.g., emission factor grams per horsepower-hour)

The product of the annual hours of use, the average rated horsepower, and the load factor is referred to as the per-source usage rate. The product of the equipment population and the per-source usage rate is referred to as the activity level and is estimated in units of horsepower-hours. By multiplying the seasonally adjusted activity levels by the appropriate emission factor, emission estimates for an ozone season day were developed for each category of non-road equipment and vehicles in the EPA-prepared inventories.

As outlined in an April 27, 1992, memorandum[2] from EPA to all EPA Regional Offices, the first option for States developing non-road engine and vehicle emission inventories is to simply use the inventory prepared by EPA for the particular nonattainment area for which an inventory is being developed. This option was selected for the counties in the *Ozoneville CMSA (inventory preparers should reference the nonattainment areas being documented here)*. The ozone precursor emission estimates for the ozone season from inventory "A+B/2" *(or "A")* for the Ozoneville CMSA ozone nonattainment counties were taken directly from the EPA-supplied inventory for the Ozoneville CMSA.

3.0 RESULTS

The Ozoneville ozone nonattainment modeling domain emission estimates have been drawn from the OMS spreadsheets for the Ozoneville CMSA. These estimates have been summarized in

Appendix A for each county by equipment type within the nonattainment area. *(Summary tables from the spreadsheets should be submitted in this appendix.)* Emissions from all nonroad categories covered in the spreadsheets are listed by county in Table 3.1.

4.0 REFERENCES

1. U.S. Environmental Protection Agency. 1991. Non-road Engine and Vehicle Emission Study-Report. EPA 21A-2001, Office of Air and Radiation, Washington, D.C., 1991. pp. 1 to 118.

2. Memorandum from Phil Lorang, Director, Emission Planning and Strategies Division, U.S. Environmental Protection Agency, to EPA Regional Office Directors, "Status of Nonroad Inventory Work." April 27, 1992. pp. 1 to 5.

TABLE 3-1. OZONE PRECURSOR EMISSIONS FROM OTHER NON-ROAD VEHICLES AND EQUIPMENT IN OZONE STATE: 1990

Area	VOC Ozone Season (lbs/day)	NO_x Ozone Season (lbs/day)	CO Ozone Season (lbs/day)
Ozoneville Metropolitan Area[a]			
Barry	8,600	14,860	76,620
Kings	14,040	26,560	94,060
Nassau	62,960	37,260	494,500
Ozoneville	41,260	60,080	515,000
Loudon	32,260	63,980	278,220
Richmond	7,490	6,820	57,240
Rockland	11,000	6,740	86,060
Suffolk	85,820	47,000	583,580
Westchester	44,920	33,620	344,100
TOTAL	308,350	296,920	2,529,380

[a] Nonattainment area.

OTHER NON-ROAD ENGINES AND VEHICLES *(Version B)*

1.0 INTRODUCTION

The "Other Non-road Engines and Vehicles" category includes a diverse collection of equipment ranging from lawn mowers and chain saws, to recreational equipment, to farm equipment and construction machinery. The EPA conducted a study (completed in November 1991) of emissions from non-road engines and vehicles[3] to determine whether emissions from such sources cause, or significantly contribute to air pollution that may be reasonably anticipated to endanger public health or welfare.

2.0 METHODS

As part of the above study, EPA considered more than 80 different types of equipment. To facilitate analysis and reporting, EPA grouped the equipment types into the 10 equipment categories listed below:

- Lawn and Garden Equipment,
- Agricultural Equipment,
- Logging Equipment,
- Light Commercial Equipment,
- Industrial Equipment,
- Construction Equipment,
- Airport Service Equipment,
- Recreational Equipment,
- Recreational Marine Equipment, and
- Commercial Marine Vessels.[b]

Two emission inventories were developed for the first nine categories for 24 ozone and CO nonattainment areas across the country.

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[b] In this inventory, Commercial Marine Vessels is treated and discussed as a separate category.

The EPA then contracted with Energy and Environmental Analysis, Inc., (EEA) to update the non-road equipment and vehicle emission inventories based on the 1991 EPA-designated nonattainment boundaries for CO and ozone exceedance areas. These areas include the original 24 areas from the original non-road study and an additional nine areas. The 33 nonattainment areas all have had an inventory, designated as "Inventory A," prepared for them, based on commercially and publicly available data. In addition to Inventory A, the original 24 areas have been provided with two more inventories. The second inventory, designated as "Inventory B," is based on confidential, industry-supplied sales and other data that are not publicly available. The second inventory provided EPA with a cross-check for the first inventory, and the results agreed reasonably well. The third inventory is an average of both inventories and is designated "Inventory (A+B)/2." Thus, for the original 24 inventory areas, inventory preparers use Inventory (A+B)/2, and for the remaining 9 inventory areas, only Inventory A is provided, and only Inventory A can be used.

The following is a brief description of the procedures that were followed by the EEA in preparing the non-road emissions data that are being used for this inventory.

To construct the EPA non-road inventory, several factors were estimated: (1) equipment populations in the given nonattainment area; (2) annual hours of use of each type of equipment, adjusted for geographic region and for the season of interest for each pollutant studied; (3) average rated horsepower of each type of equipment; (4) typical load factor for each type of equipment; and (5) an emission factor for each of the 79 categories of equipment. In developing emissions inventories for non-road engines and vehicles, the EPA used the following formula to calculate emissions for most of the 79 non-road categories:

$$M_i = N \times HRS \times HP \times LF \times EF_i$$

where:

M_i = mass of emissions of i^{th} pollutant during inventory period

N = source population

HRS = annual hours of use

HP = average rated horsepower

LF = typical load factor

EF_i = average emissions of i^{th} pollutant per unit of use (e.g., emission factor grams per horsepower-hour)

The product of the annual hours of use, the average rated horsepower, and the load factor is referred to as the per-source usage rate. The product of the equipment population and the per-source usage rate is referred to as the activity level and is estimated in units of horsepower-hours. By multiplying the seasonally adjusted activity levels by the appropriate emission factor, emission estimates for an ozone season day were developed for each category of non-road equipment and vehicles in the EPA-prepared inventories.

As outlined in an April 27, 1992, memorandum[4] from EPA to all EPA Regional Offices, states developing non-road engine and vehicle emission inventories may use the inventory prepared by EPA for the particular nonattainment area for which an inventory is being developed. This option cannot be used if the area is less than a serious nonattainment area and thus, is not one of the 33 inventoried areas. The April 27, 1992, memorandum also provided options for areas not included in the list of nonattainment areas for which EPA was preparing non-road emissions inventories. The first option, the one selected for this inventory, is to match the area for which the ozone inventory is being prepared to one of the 33 areas for which there are EPA-prepared inventories. In this procedure, the annual activity levels and the overall non-road inventory for the area is proportioned to one of the 33 areas, based on the human population of the two areas. This method is discussed in more detail in the memorandum from Keith Baugues to EIB Staff and cc'ed to Radian Corporation, in Appendix A.

3.0 RESULTS

For the Ozoneville ozone nonattainment modeling domain, the EPA-supplied inventory for the Boston & Springfield CMSA's *(fill in the name of the inventory surrogate area)* was selected as the non-road inventory from which adjustments were to be made. The Boston & Springfield CMSA's was selected as the most appropriate match because of its relative geographical position and climatic conditions, and upon consultation with staff at EPA's Emissions Inventory Branch. For each *Ozone (fill in the name of the state being inventoried)* State county, an adjustment factor based on the ratio of the human population of that county to that of Boston & Springfield CMSA's was used to adjust the EPA-supplied non-road ozone season emission inventory for the Boston & Springfield CMSA's to each *Ozone* State county. Human population data were obtained from 1990 Census data for each *Ozone* State county, and the surrogate area's emissions have been proportioned. These estimates have been summarized in Appendix B for each county by equipment type within the nonattainment area. *(Summary tables from the spreadsheets should be submitted in this appendix.)* Emissions from all nonroad categories covered in the spreadsheets are listed by county in Table *.3-1.

Include the following paragraph, or sentences to the same effect, if partial counties are inventoried.

For the Nozonia County *(list county names)* ozone nonattainment area, a sub-county population was used to develop emissions for the part of the county that is classified nonattainment. The sub-county population (100,965) results in an apportioning factor of 32.8% of the total *Nozonia* County emissions. The emissions for the nonattainment portion of *Nozonia* County are shown under the *Ozoneville* Metropolitan Area in Table 3-1.

4.0 REFERENCES

3. U.S. Environmental Protection Agency. 1991. Non-road Engine and Vehicle Emission Study-Report. EPA 21A-2001, Office of Air and Radiation, Washington, D.C., 1991. pp. 1 to 118.

4. Memorandum from Phil Lorang, Director, Emission Planning and Strategies Division, U.S. Environmental Protection Agency, to EPA Regional Office Directors, "Status of Nonroad Inventory Work." April 27, 1992. pp. 1 to 5.

TABLE 3-1. OZONE PRECURSOR EMISSIONS FROM OTHER NON-ROAD VEHICLES AND EQUIPMENT IN OZONE STATE: 1990

Area	VOC Ozone Season (lbs/day)	NO_x Ozone Season (lbs/day)	CO Ozone Season (lbs/day)
Ozoneville Metropolitan Area[a]			
Barry	8,600	14,860	76,620
Kings	14,040	26,560	94,060
Nassau	62,960	37,260	494,500
Ozoneville	41,260	60,080	515,000
Loudon	32,260	63,980	278,220
Richmond	7,490	6,820	57,240
Rockland	11,000	6,740	86,060
Suffolk	85,820	47,000	583,580
Westchester	44,920	33,620	344,100
TOTAL	308,350	296,920	2,529,380

[a] Nonattainment area.

APPENDIX A

(Appendix for Both Versions of the Sample Text)

MEMORANDUM

SUBJECT: Documentation of a Procedure to Estimate Nonroad Emissions for Areas Not Included in the OMS "33 Area" Study

FROM: Keith Baugues

TO: EIB Staff

This memorandum serves to document the procedures utilized for preparing nonroad emission estimates for nonattainment areas not included in the OMS "33 Area" study.

Table I lists the areas covered by the 33 Area study and displays whether the study covered ozone, carbon monoxide (CO) or both.

Other ozone and CO nonattainment areas were assigned to one of these 33 areas based on proximity and an attempt to match areas at similar latitudes. Tables II and III show the results of this assignment.

Emissions for these other areas are to be estimated in AIRS AMS. The spreadsheets for the entire surrogate MSA are to have the activity level data adjusted by a ratio of the human population of the county of interest divided by the human population for the surrogate MSA. Adjusted activity data, along with the required parameters will be entered into AMS where revised emission calculations will be performed. Attachment 1 shows the columns that need to be adjusted.

A diskette with two spreadsheets is attached. The two files are OZ_POP.WK1 and CO_POP.WK1. These files list he counties in each nonattainment area, the population, the surrogate MSA, the population for the surrogate MSA and the ratio of the county population divided by the surrogate MSA population.

You will note that some county names are preceded by a "P". This indicates that the nonattainment area contains a portion of the county. The population value for that county reflects only the nonattainment portion. These values were provided by Barry Gilbert, AQMD. In order to enter data into AMS for these partial counties someone will need to establish Zones. State participation will be needed.

Any questions on this methodology should be addressed to Keith Baugues (919) 541-5366 until November 27, 1992 and to Lee Gabele (919) 541-5292 after that date.

cc: Radian (w diskette)

APPENDIX A

(Appendix for Both Versions of the Sample Text)

MEMORANDUM

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You will note that some county names are preceded by a "P". This indicates that the nonattainment area contains a portion of the county. The population value for that county reflects only the nonattainment portion. These values were provided by Barry Gilbert, AQMD. In order to enter data into AMS for these partial counties someone will need to establish Zones. State participation will be needed.

Any questions on this methodology should be addressed to Keith Baugues (919) 541-5366 until November 27, 1992 and to Lee Gabele (919) 541-5292 after that date.

cc: Radian (w diskette)

TABLE 1

33 AREAS INCLUDED IN OMS NONROAD STUDY

AREA	OZONE	CO
Anchorage, AK	N	Y
Atlanta, GA	Y	N
Baltimore, MD	Y	Y
Baton Rouge, LA	Y	N
Beaumont, TX	Y	N
Boston, MA	Y	Y
Chicago, IL	Y	Y
Cleveland, OH	Y	Y
Denver, CO	Y	Y
El Paso, TX	Y	Y
Hartford, CT	Y	Y
Houston, TX	Y	N
Las Vegas, NV	N	Y
Miami, FL	Y	N
Milwaukee, WI	Y	N
Minneapolis, MN	N	Y
Muskegon, MI	Y	N
New York, NY	Y	Y
Philadelphia, PA	Y	Y
Phoenix, AZ	Y	Y
Portsmouth, NH	Y	N
Providence, RI	Y	N
Provo, UT	N	Y
San Diego, CA	Y	Y
San Joaquin Valley, CA	Y	N
Seattle, WA	Y	Y
Sheboygan, WI	Y	Y
South Coast, A	Y	Y
Spokane, WA	N	Y
Springfield, MA	Y	Y
St. Louis, MO	Y	Y
Tucson, AZ	N	Y
Washington, DC	Y	Y

TABLE II

OZONE NONATTAINMENT AREAS NOT COVERED IN OMS 33 AREA STUDY

NONATTAINMENT AREA	SURROGATE AREA
Birmingham, AL	Atlanta, GA
Monterey Bay, CA	San Joaquin Valley, CA
Sacramento, CA	San Joaquin Valley, CA
San Francisco, CA	San Joaquin Valley, CA
Santa Barbara, CA	Los Angeles, CA
Southeast Desert, CA	Los Angeles, CA
Ventura County, CA	Los Angeles, CA
Sussex County, DE	Baltimore, MD
Tampa, FL	Miami, FL
Jersey County, IL	St. Louis, MO
Evansville, IN	St. Louis, MO
Indianapolis, IN	St. Louis, MO
Louisville, KY	St. Louis, MO
South Bend, IN	Chicago, IL
Cincinnati, OH	Cleveland, OH
Edmonson County, KY	St. Louis, MO
Huntington-Ashland, KY-OH-WV	Cleveland, OH
Lexington-Fayette, KY	St. Louis, MO
Owensboro, KY	St. Louis, MO
Paducah, KY	St. Louis, MO
Lake Charles, LA	Beaumont, TX
Hancock & Waldo Counties, ME	Portsmouth, NH
Knox & Lincoln Counties, ME	Portsmouth, NH
Lewiston-Auburn, ME	Portsmouth, NH
Portland, ME	Portsmouth, NH
Kent & Queen Anne's Counties, MD	Baltimore, MD
Detroit, MI	Cleveland, OH
Grand Rapids, MI	Muskegon, MI
Reno, NV	Denver, CO
Manchester, NH	Portsmouth, NH

TABLE II (Continued)

NONATTAINMENT AREA	SURROGATE AREA
Allentown, PA	Philadelphia, PA
Atlantic City, NJ	Philadelphia, PA
Albany, NY	New York, NY
Buffalo, NY	New York, NY
Essex County, NY	New York, NY
Jefferson County, NY	New York, NY
Poughkeepsie, NY	New York, NY
Charlotte, NC	Atlanta, GA
Raleigh, NC	Atlanta, GA
Greensboro, NC	Atlanta, GA
Canton, OH	Cleveland, OH
Columbus, OH	Cleveland, OH
Dayton, OH	Cleveland, OH
Toledo, OH	Cleveland, OH
Youngstown, OH	Cleveland, OH
Portland, OR	Seattle, WA
Altoona, PA	Philadelphia, PA
Erie, PA	Cleveland, OH
Harrisburg, PA	Philadelphia, PA
Johnston, PA	Philadelphia, PA
Lancaster, PA	Philadelphia, PA
Pittsburgh, PA	Cleveland, OH
Reading, PA	Philadelphia, PA
Scranton, PA	Philadelphia, PA
York, PA	Philadelphia, PA
Cherokee County, SC	Atlanta, GA
Knoxville, TN	Atlanta, GA
Memphis, TN	Atlanta, GA
Nashville, TN	Atlanta, GA
Dallas, TX	Houston, TX
Salt Lake City, UT	Denver, CO
Norfolk, VA	Baltimore, MD

TABLE II (Continued)

NONATTAINMENT AREA	SURROGATE AREA
Richmond, VA	Baltimore, MD
Smyth County, VA	Baltimore, MD
Charleston, WV	Baltimore, MD
Greenbrier County, WV	Baltimore, MD
Parkersburg, WV	Baltimore, MD
Door County, WI	Milwaukee, WI
Kewaunee County, WI	Milwaukee, WI
Manitowoc County, WI	Milwaukee, WI
Walworth County, WI	Milwaukee, WI

TABLE II (Continued)

TABLE III

CO NONATTAINMENT AREAS NOT COVERED IN OMS 33 AREA STUDY

NONATTAINMENT AREA	SURROGATE AREA
Fairbanks, AK	Anchorage, AK
Chico, CA	Provo, UT
Fresno, CA	Las Vegas, NV
Lake Tahoe South, CA	Provo, UT
Modesto, CA	Las Vegas, NV
Sacramento, CA	Provo, UT
San Francisco, CA	Las Vegas, NV
Stockton, CA	Provo, UT
Colorado Springs, CO	Denver, CO
Fort Collins, CO	Denver, CO
Longmont, CO	Denver, CO
Duluth, MN	Minneapolis, MN
Missoula, MT	Seattle, WA
Reno, NV	Las Vegas, NV
Albuquerque, NM	Phoenix, AZ
Syracuse, NY	Cleveland, OH
Raleigh, NC	Baltimore, MD
Winston-Salem, NC	Baltimore, MD
Grants Pass, OR	Seattle, WA
Klamath Falls, OR	Seattle, WA
Medford, OR	Seattle, WA
Portland, OR	Seattle, WA
Memphis, TN	St. Louis, MO
Ogden, UT	Provo, UT

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SECTION E

BIOGENIC EMISSIONS

Section E

Biogenic Sources

In accordance with the EPA requirement that Biogenic Emissions be reported for base year emission inventories in moderate, serious, severe, and extreme ozone non-attainment areas this report has been prepared. These emissions are calculated using the PC-Biogenic Emissions Inventory System (PC-BEIS). The non-methane hydrocarbon emissions were calculated on an hourly basis for the day selected in accordance with the instructions in the PC-BEIS manual.

The day selected was August 14, 1988. This was the fourth hottest day of the ten highest ozone season days in the last three years. Temperatures from four regional weather stations were averaged to select the appropriate day. The Air Quality Modeling Section provided the required meteorological data for that date. Information was retrieved from the records of the weather at Logan International Airport, Boston and Worcester Municipal Airport, Worcester, Massachusetts; Green Airport, Providence, Rhode Island and Bradley International Airport, Windsor, Connecticut.

The weather data was used in the program to create reports using the closest airport to each county. The counties were assigned as follows:

Assignment of Counties to Regional Airport	
Worcester	Worcester Municipal @ Worcester, MA
Essex, Middlesex, Norfolk & Suffolk	Logan @ Boston, MA
Barnstable, Bristol, Dukes, Plymouth & Nantucket	Green International Airport @ Providence, RI
Berkshire, Franklin, Hampden & Hampshire	Bradley @ Windsor, CT

The details of the meteorological data is listed on the PC-BEIS Reports accompanying this report and on separate data sheets. Although PCBEIS requires the temperature and wind speed to be entered in Metric units, the English equivalents are provided and the appropriate conversions performed. The day selected was hot (94 Deg F), windy, partly cloudy and relatively dry during daylight. These are not unusual conditions during the ozone season.

The PCBEIS Program calculates the non-methane VOC emissions from the forest canopy and ground cover using data describing the size and location of each county, the total solar illumination on the chosen day, the relative humidity, wind speed, and temperature for each hour of that day. These are factored into the modeling equation. This program was developed to calculate the non-methane VOC's biogenicaly produced. These emissions considered are the isoprene, monoterpenes, a-pinene and other unidentified hydrocarbons. These chemicals are considered to be photogenically involved in the generation of photochemical smog and ozone. The emissions calculated by the program sum to 655 Tons on the typical ozone season day. Tables listing the hourly production of these chemicals accompany this report.

TABLE E-2

Selection of Target Date for PCBEIS Calculation using data from Dept. of Environmental Prot. Air Quality Reports and DAQC Planning Division Meteorological Data

1. List of Peak Ozone Days Sorted by Values			2. Select 10 highest and associate with temperature records			
6/22	1988	0.213	6/22	1988	0.213	91.0
7/11	1988	0.182	7/11	1988	0.182	96.0
7/08	1988	0.180	7/08	1988	0.180	94.0
7/16	1988	0.176	7/16	1988	0.176	90.0
8/14	1988	0.170	6/15	1988	0.170	97.0
6/15	1988	0.170	8/14	1988	0.170	94.0
8/04	1989	0.168	8/04	1989	0.168	89.0
6/16	1988	0.167	6/16	1988	0.167	90.0
7/30	1988	0.165	7/30	1988	0.165	95.0
7/14	1988	0.162	7/14	1988	0.162	86.0
6/13	1988	0.152	3. Sort by Temperature			
6/21	1989	0.150				
8/04	1989	0.148	6/15	1988	0.170	97.0
6/27	1989	0.144	7/11	1988	0.182	96.0
7/20	1990	0.143	7/30	1988	0.165	95.0
8/17	1990	0.139	8/14	1988	0.170	94.0
6/02	1990	0.139	7/08	1988	0.180	94.0
9/09	1989	0.136	6/22	1988	0.213	91.0
7/19	1989	0.133	6/16	1988	0.167	90.0
7/19	1990	0.132	7/16	1988	0.176	90.0
8/04	1989	0.132	8/04	1989	0.168	89.0
9/10	1989	0.131	7/14	1988	0.162	86.0
7/02	1989	0.128	4. Select 4th Highest			
			8/14	1988	0.170	94.0

File: A:\SELECT3.WPF

Weather Conditions for Boston, Mass. (LOGAN)
August 14, 1988
Provided by R.F. Fields

Time	Sky Cover	Relative Humidity	Wind Speed M/Sec	Temp Deg C
1	0.2	0.77	5.7	28.3
2	0.3	0.80	5.1	27.7
3	0.2	0.82	2.6	27.2
4	0.2	0.85	2.6	26.6
5	0.3	0.81	3.1	27.2
6	0.3	0.76	1.0	28.3
7	0.2	0.72	4.1	28.8
8	0.2	0.72	4.1	29.4
9	0.2	0.70	2.1	30.5
10	0.3	0.70	4.6	31.1
11	0.4	0.73	6.7	33.3
12	0.7	0.76	6.2	30.5
13	0.8	0.79	7.2	27.2
14	1.0	0.79	6.7	26.6
15	0.8	0.79	6.7	26.1
16	0.8	0.79	4.6	25.5
17	1.0	0.96	9.3	27.2
18	0.8	0.73	9.3	29.4
19	0.3	0.70	8.7	31.1
20	1.0	0.71	8.2	30.5
21	0.7	0.71	6.7	29.4
22	0.4	0.72	6.2	28.8
23	0.7	0.79	2.1	26.1
24	0.7	0.80	1.0	26.1

Weather Conditions for Providence, R.I. (GREEN)
August 14, 1988

Time	Sky Cover	Rel. Humid.	Wind Speed M/Sec	Wind Speed Mis/Hr	Temp Deg C	Temp Deg F
1	0.6	88.0	4.10	9.2	25.5	77.9
2	0.4	88.0	3.60	8.1	25.5	77.9
3	0.4	88.0	4.10	9.2	25.5	77.9
4	0.4	88.0	4.10	9.2	25.5	77.9
5	0.4	87.0	3.60	8.1	26.1	79.0
6	0.5	86.0	5.10	11.5	26.1	79.0
7	0.3	85.0	4.60	10.4	26.1	79.0
8	0.2	78.0	5.10	11.5	28.3	82.9
9	0.4	71.0	3.10	7.0	30.5	86.9
10	0.4	64.0	3.10	7.0	32.2	90.0
11	0.6	61.0	4.10	9.2	33.8	92.8
12	0.7	57.0	5.70	12.8	35.0	95.0
13	0.8	54.0	8.20	18.5	34.4	93.9
14	0.7	58.0	7.70	17.3	33.3	91.9
15	0.9	62.0	8.70	19.6	32.7	90.9
16	0.9	66.0	7.70	17.3	31.6	88.9
17	1.0	69.0	7.20	16.2	30.5	86.9
18	0.5	71.0	7.70	17.3	28.8	83.8
19	0.5	74.0	8.70	19.6	27.7	81.9
20	0.7	77.0	6.70	15.1	27.7	81.9
21	0.5	79.0	6.20	14.0	26.1	79.0
22	0.7	82.0	6.70	15.1	25.5	77.9
23	1.0	81.0	5.70	12.8	25.5	77.9
24	0.5	81.0	4.20	9.5	25.5	77.9

Weather Conditions for Providence, R.I. (GREEN)
August 14, 1988

Time	Sky Cover	Rel Humid	Wind Speed M/Sec	Wind Speed Mis/Hr	Temp Deg C	Temp Deg F
1	0.6	88.0	4.10	9.2	25.5	77.9
2	0.4	88.0	3.60	8.1	25.5	77.9
3	0.4	88.0	4.10	9.2	25.5	77.9
4	0.4	88.0	4.10	9.2	25.5	77.9
5	0.4	87.0	3.60	8.1	26.1	79.0
6	0.5	86.0	5.10	11.5	26.1	79.0
7	0.3	85.0	4.60	10.4	26.1	79.0
8	0.2	78.0	5.10	11.5	28.3	82.9
9	0.4	71.0	3.10	7.0	30.5	86.9
10	0.4	64.0	3.10	7.0	32.2	90.0
11	0.6	61.0	4.10	9.2	33.8	92.8
12	0.7	57.0	5.70	12.8	35.0	95.0
13	0.8	54.0	8.20	18.5	34.4	93.9
14	0.7	58.0	7.70	17.3	33.3	91.9
15	0.9	62.0	8.70	19.6	32.7	90.9
16	0.9	66.0	7.70	17.3	31.6	88.9
17	1.0	69.0	7.20	16.2	30.5	86.9
18	0.5	71.0	7.70	17.3	28.8	83.8
19	0.5	74.0	8.70	19.6	27.7	81.9
20	0.7	77.0	6.70	15.1	27.7	81.9
21	0.5	79.0	6.20	14.0	26.1	79.0
22	0.7	82.0	6.70	15.1	25.5	77.9
23	1.0	81.0	5.70	12.8	25.5	77.9
24	0.5	81.0	4.20	9.5	25.5	77.9

Weather Conditions for Windsor, Conn.
(BRADLEY)
August 14, 1988
Provided by R.F. Fields

Time	Sky Cover	Rel Humid	Speed M/Sec	Temp Deg C
1	0.3	0.79	2.6	27.7
2	0.3	0.82	3.1	27.2
3	0.3	0.85	2.1	26.1
4	0.3	0.88	3.1	25.5
5	0.6	0.87	3.1	26.1
6	0.6	0.86	2.6	26.1
7	0.4	0.85	4.1	26.6
8	0.4	0.79	4.1	28.3
9	0.4	0.72	4.1	30.5
10	0.4	0.66	3.1	32.2
11	0.5	0.62	4.1	33.3
12	0.5	0.57	4.1	33.8
13	0.6	0.53	5.7	35.0
14	0.6	0.55	5.7	34.4
15	0.7	0.56	5.7	34.4
16	0.7	0.58	7.2	33.8
17	0.8	0.60	5.7	32.7
18	0.7	0.61	5.1	32.2
19	0.7	0.63	4.6	31.1
20	0.2	0.68	4.1	30.0
21	0.3	0.72	5.1	28.3
22	0.6	0.77	4.1	27.4
23	0.7	0.80	3.6	26.6
24	0.6	0.80	2.5	24.4

Selection of Average Temperature for PCBEIS Calculation
Data from DAQC Planning Meteorological Data

Date	Boston	Providence	Bradley	Worcester	Average
	T max	T max	T max	T max	
6/22/88	91	93	93	86	91
7/11/88	99	97	95	91	96
7/08/88	94	87	97	96	94
7/16/88	92	87	92	87	90
6/15/88	98	97	97	94	97
8/14/88	92	95	95	93	94
8/04/89	88	88	94	87	89
6/16/88	92	83	93	91	90
7/30/88	96	94	98	92	95
7/14/88	87	80	89	87	86

RESPONSE TO EPA COMMENTS ON THE SIP

In response to the EPA comments on Section 8 Biogenic Sources,

we have recalculated the emissions using the PCBEIS program following the guidelines suggested by the EPA. The exception to this is we used an average of the temperature at four meteorological stations to calculate the fourth hottest of the 10 highest ozone days for the period under consideration. To use each separate record to determine the specific day for each county would have resulted in calculating biogenic emissions for different days for each county. The method we chose to use calculated the emissions for each county on the same day using the hourly meteorological record for the met station closest or most similar to the county. we believe this produces a more realistic result than using different stations and different days.

We incorrectly thought the latitude and Longitude of the counties was linked to the FIPS number. The recalculation using the approximate Latitude and Longitude of the centroid of the county resulted in very little difference in calculated emissions. We attribute this to the minor difference in peak sun angle between Massachusetts and Tennessee so close to the summer solstice.

As we have direct access to the meteorological data on the date chosen for the calculation we decided not to use the files provided by the EPA.

We hope this response adequately answers your questions.

MASSACHUSETTS BIOGENIC SUMMARY
by GREG WARNER 9-17-92

County	County FIPS #	Lat.	Long.	VOC TONS SUMMER DAY
Barnstable	25001	41.40	70.20	35.73
Berkshire	25003	42.25	73.05	95.78
Bristol	25005	41.55	71.10	34.94
Dukes	25007	41.20	70.40	9.22
Essex	25009	42.40	71.00	31.45
Franklin	25011	42.35	72.35	73.78
Hampden	25013	42.05	72.40	58.87
Hampshire	25015	42.20	72.45	48.79
Middlesex	25017	42.25	71.20	48.70
Nantucket	25019	41.05	70.05	2.97
Norfolk	25021	42.10	71.15	24.68
Plymouth	25023	42.00	70.50	53.06
Suffolk	25025	42.20	71.05	1.60
Worcester	25027	42.20	71.45	131.67
TOTAL (Tons per summer Day)				651.24

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SECTION F

F.1 QUALITY ASSURANCE
F.2 QUALITY ASSURANCE PLAN
F.3 REQUEST FOR LOE CONTRACTOR

F.1 QUALITY ASSURANCE PLAN

I. Objectives and Overview

This is the Quality Assurance (QA) plan which will ensure the development of complete, accurate and consistent emission inventories for Massachusetts. The more stringent, amended ozone control programs for Massachusetts demand that the technical basis for strategy development and air quality assessment be as good as possible. This QA plan and the ensuing work will improve the quality of the Massachusetts inventories. It reflects the requirements of EPA QA guidance[10],[13],[14] and revisions will be made to update the plan as needed.

Inventory quality control and quality assurance is a set of procedures to verify that emission and facility data meet standards for providing good information. These procedures, including independent audits, should be in place when developing inventories so the information developed will be of known, verified quality. Once QA has been done, it improves user and department confidence in the data. Better data, of known quality, provides a better basis for contorl programs and for the modeled assessment of program air quality impacts. Once established, QA procedures make subsequent inventory efforts less resource intensive.

II. Quality Assurance Process

A. Staffing

To the extent possible, quality control systems will be followed by staff developing the inventories and audited by independent staff. Nonetheless, certain quality control tasks, such as basic arithmetic checks, could also be conducted by independent staff.

Two staff members of the Information Systems Branch will prepare the Massachusetts inventories. One has already prepared a base year inventory and attended the EPA Inventory Development Workshop in June 1991. Both will be supervised by the Branch Chief and supported occasionally by specified staff members in the Program Development Groups working on the permits and SIP revisions. The Information Systems Branch have first developed the Inventory Preparation Plan (IPP), which this QA plan is submitted with.

B. Tasks and Schedule

The quality of the inventory information will be established by inventory preparation and assurance tasks. Inventory development is described in previous sections of the IPP.

The quality control tasks include review of inventory components, recommendations for improvements, subsequent emission estimation revisions, calculation of quality indicators and documentation in the QA report. EPA's review (LOE contractor) of the draft inventories would also serve as an audit.

C. Summary of Quality Control Systems

The automated DEP-DAQC Stationary Source Enforcement Inventory System (SSEIS) have programmed verification edits for outlying data (like 2000 foot stack heights) and data which should be correlated but is not (e.g., a mechanical collector system that is over 90% efficient). Data collection control is accomplished through several techniques, described in more detail under the specific Point, Area and Mobile components of the inventories. This includes individual verbal checks with the agency that generates the data that activity data is as current as possible, such as fuel use. Calculation methods will be taken from the most recent EPA guidance or air pollution test results and literature.

A quality assurance statement (Appendix F) will be submitted with the final QA report to certify that procedures were followed in accordance with the plan, and data in the inventories submitted were revised as required to meet actual conditions in the Commonwealth.

D. Summary of Constraints

Activity data is drawn from many different sources.

Inventory staffing is set at 3 work years, so certain priority categories will receive full development effort, based on emissions and facility universe estimates. Other categories will not receive as much development or QA attention. These priority and non-priority categories will be spelled out in the QA report.

Audit personnel will be given as long a timeframe as possible to conduct full audits of various inventory portions, actual time allocated will be constrained by other SIP development priorities.

III. Quality Assurance Technical Procedures

A. General

1. Source List Comprehensiveness

a. Review source category list for completeness

   b. Check independent facility listings for sources omitted from the inventory

2. Data Collection and Handling
   a. Routine data handling procedures and calculation methods. Actual activity level or emission measurements are the best and preferred data.
   b. Review of design of source registration (SR's) and survey forms.
   c. Review of SR's and survey forms for accuracy in coding.
   d. Custody of data will be documented.
   e. Check for data entry errors.
3. Emission Calculations
   a. Repeat random emission estimation calculations to assure that the method can be repeated
   b. Check for arithmetic accuracy
   c. Review for accuracy relative to earlier and other inventories.
4. Validation

   To check the reasonableness of related activity levels, emission totals, and process/emission factor relationships.
5. Data quality indicators will be used as provided by EPA guidance or developed, if possible. A matrix of the confidence level of the emission factors and the activity levels could be one measure of emission estimation quality. Another qualitative measure of the

inventory quality would be a discussion of critical data elements and how the values employed affect the inventory results. For example, the emission factor for a significant emission category could be a range and the average value may be selected. Depending upon the percentage variance between the average and the highest value, the estimate could be underestimated to that same degree.

B. Point Source Inventory Component

The point source inventory is in an automated database (SSEIS) with programmed editing checks.

There will be checks for SIC coding, repeat sources, sources within a category with unreasonably low, or high, emissions.

Point source information will be crosschecked with The National Toxic Release Inventory System (TRIS) for SARA 313 reporting records, industrial trade journals and other DEP division's databases.

C. Area Source Inventory Component

The first QA validation procedure is the adherence to EPA's guidances[4],[9] to check whether EPA's methods and procedures are accurately followed. The activity and emission factors are to be checked whether they are the most appropriate in each category. Other QA validation procedures include checks for mathematical calculations, seasonal adjustments, double counting with Point Source categories, county apportionment of emissions and ensuring that all Area

Source categories are covered.

D. Mobile Source Inventory Component

The transportation data such as daily vehicle miles traveled activity level and speeds would be provided by MDPW and system level transportation models would be investigated to see if the link data could provide better values. Other QA/QC efforts are expected to be performed by MDPW before submittal of transportation data.

Important emission factor parameters include vehicle characteristics, Inspection and Maintenance data for in-use vehicles. Temperature values must be selected appropriately, but are obtained from LCD's and air quality monitoring stations. Reid Vapor Pressure information for 1990 would be taken from the DEP-DAQC regulatory compliance program.

F.2

ADDENDUM TO DEP-IPP QA PLAN

BY: Robert Quevillon

DATE: January 10, 1992

Introduction

In a letter dated September 30, 1991 EPA commented upon its review of the Massachusetts DEP draft IPP plan. Comments 11 thru 14 and 20 thru 28 deal directly with the Quality Assurance section of the IPP Plan. This report contains DEP responses to the above mentioned comments and are meant as an enhancement to the IPP-QA plan itself and are meant to be incorporated therein by reference.

Response to EPA comment no. 11:

During the beginning of November 1991 the DEP-Division of Air Quality Control enlisted the help of the Division's Air Quality Surveillance Branch-Quality Assurance Section (AQSB-QAS). The Division requested that the AQSB-QAS conduct an independent review of the draft IPP plan, the efforts under way to produce the 1990 base year inventory, and modify the IPP QA plan to address EPA guidance materials and to address EPA draft IPP review comments.

In addition, three (3) quality control (QC) personnel will be chosen for the purpose of performing a comprehensive review of the Draft and Final 1990 Base Year emissions Inventory prior to submitting the inventory to EPA. These QC and QA efforts will be over and above the normal day to day quality control efforts which are incorporated into the maintenance of the Inventory data base.

Response to EPA comment no. 12:

The calculation of quality indicators can be accomplished by having quality control (QC) personnel manually recalculate emissions from a sampling of sources (perhaps up to 10 % of total) that are contained in each source category and sub-category and comparing the results with the emissions which are on record in the emissions inventory. With this sampling of information a statistical analysis could be performed in which the % difference, standard deviation and upper and lower 95% percentile probability limits (confidence level) of the data in the inventory. The results of these calculations would give the reviewer the ability to determine how precise the data is. This technique is borrowed from 40 CFR part 58 and is commonly applied to determine the precision and accuracy of ambient air monitoring data.

Having said this, implementing the QC/QA of the emissions inventory to this level of sophistication is resource intensive and can be counter-productive if other more fundamental aspects of the emissions inventory such as determining accuracy of sources of data and applicability of formulas suffers as a result.

Response to EPA comment no. 13:

There is a pie chart on Attachment 3 of the IPP which shows the relative percentages of contribution to total emissions in the Commonwealth of Massachusetts due to point, area, and mobile sources. It is the intention of the DEP to concentrate QC/QA efforts most proportionally on mobile sources since this is the category where most of the emissions occur. However, the QC/QA of the mobile source category should proceed rather quickly since compared to area and point sources, there are a small sub-set of factors that come into play in determining emissions. This situation is advantageous in that it allows for a greater amount of resources to be put into exploring the validity and integrity of the background data used in calculating emissions data.

The stationary area source category will be next on the priority list and will likely require a substantial amount of resources not only to verify the assumptions made in emission factor determination, but also to develop new sub-categories (classifications) such as breweries and bakeries.

At the opposite end of the spectrum are major stationary point sources. The point source category is the oldest and most evolved of the categories. The AP-42 does a good job on those source classifications which are covered. There are however, source classifications which are relatively new, such as electronic circuit board manufacture. In such cases it will be necessary to verify the assumptions made to obtain emission factor estimates from other means.

Response to EPA comment no. 14:

The task of determining the completeness of the source category list has been made relatively easy by referring to the abundance of guidance literature that EPA has provided on this topic.

In regards to using "other" emissions inventories as a basis of comparison in determining the relative accuracy of emissions calculations, it is questionable whether "other" means other state emission inventories or other types of inventories. I can rule out periodic, RFP projection and modeling inventories since these are derived from the completed 1990 base year inventory. Using other state inventories as a basis of comparison would be useful and interesting. However, given current resource constraints the Commonwealth of Massachusetts must consider this an optional exercise to be pursued once some of the more immediate QC/QA commitments for this project have been completed.

In regards to validating the reasonableness of the variables used in calculating emission estimates, this will vary on a case by case basis. The most reliable variables available will be used in calculating the emission estimates. For each emissions estimate an attempt will be made to determine and document the reliability of each of the variables that goes into the emissions estimate.

Response to EPA comment No. 20

A policy statement will be included with the submission of the draft and final 1990 base year inventory to EPA. The proposed language of the policy statement is as follows:

1990 Base Year Emission Inventory Quality Assurance Plan Policy Statement (Proposed)

The enclosed 1990 base year emissions inventory for volatile organic compounds (VOCs) and carbon monoxide (CO) is being submitted to the U.S. Environmental Protection Agency at this time in order to comply with Title I of the 1990 Clean Air Act Amendments(CAAA).

The importance of this inventory is recognized in that it will be used to develop other inventories and will be used for development of the State Implementation Plan (SIP).

Therefore, DEP-DAQC has strived to allocate the necessary resources needed to generate an inventory which will meet EPA requirements as set forth in various EPA guidance documents, including: "Guidance for Initiating Ozone/CO SIP Emission Inventories Pursuant to the 1990 Clean Air Act Amendments".[12]

The allocated resources will include a Quality Control (QC) component which will ensure that the precision of the inventory data meets the intended purpose.

In addition, resources will be allocated to provide a Quality Assurance (QA) component which will ensure that the accuracy of the inventory data meets the intended purpose.

The Quality Assurance (QA) report for this project is being submitted as an appendix to the 1990 base year inventory. The purpose of the QA report is to describe the quality control and the quality assurance efforts which have been implemented in conjunction with the development of the inventory. The report also describes in an unbiased manner the results of an independent internal review of the inventory prior to the submittal of the inventory to the U.S. Environmental Pprotection Agency.

The quality assurance efforts will be conducted in a manner consistent with various EPA guidance documents including: "Guidance for the Preparation of Quality Assurance Plans for O3/CO SIP Emission Inventories" (EPA-450/4-88-023)[13] and "Quality Review Guidelines for 1990 Base Year Emission Inventories" (EPA-450/4-91-022)[14].

The purpose of these Quality Assurance efforts for the 1990 Base Year Inventory is to provide feedback to inventory personnel during the developmental stage of the inventory and to provide an unbiased assessment of the draft and final emission inventory report.

signed ______________________________
Agency Administrator

signed ______________________________
Quality Assurance Coordinator

Response to EPA comment no. 21

A description of the flow of inventory data is as follows:

Point sources

The four (4) DEP regional offices have the primary responsibility for generating the emissions inventory for point sources. However, this is done in coordination with the DEP-DAQC-Information Systems branch (ISB). The process is initiated when the ISB sends to each region a list of sources which will be mailed a source registration (SR) questionnaire in a given year. The regional offices review the list and advise the ISB as to any needed changes. The ISB makes the necessary changes to the list and then sends out a mass mailing of the SR questionnaires to the sources.

The sources complete the questionnaires and return the questionnaires to the appropriate DEP regional office. Each regional office reviews the completed SR questionnaires for completeness and integrity and enters the SR information into the Stationary Source Enforcement Inventory System (SSEIS) computer data base. Regional office personnel also visit a percentage of the sources in order to verify the accuracy of the information given on the questionnaires. The ISB screens the SSEIS input from each of the four (4) regional offices and identifies sources for which data is missing and/or anomalous. The ISB sends lists of these anomalous sources to the appropriate regional office(s) for follow-up investigative and corrective action.

Area Sources

The calculation of area source emissions is performed by personnel in the DEP-DAQC-ISB. Area source emissions are generally calculated using activity level which are multiplied by appropriate emissions factors. Section B of this IPP presents a brief discussion of the Area Source Categories and emission calculation methodologies.

Mobile Sources

The calculation of mobile source emissions is performed by personnel in the DEP-DAQC-ISB using activity data obtained from the Massachusetts Department of Public Works (MDPW) and emission factors derived from Mobile-4.1 software. The DAQC Area Programs Implementation Branch is responsible for running the Mobile 4.1 model including the application of transportation inputs. Section C of this IPP presents a description of the Mobile Source Emission Inventory inputs.

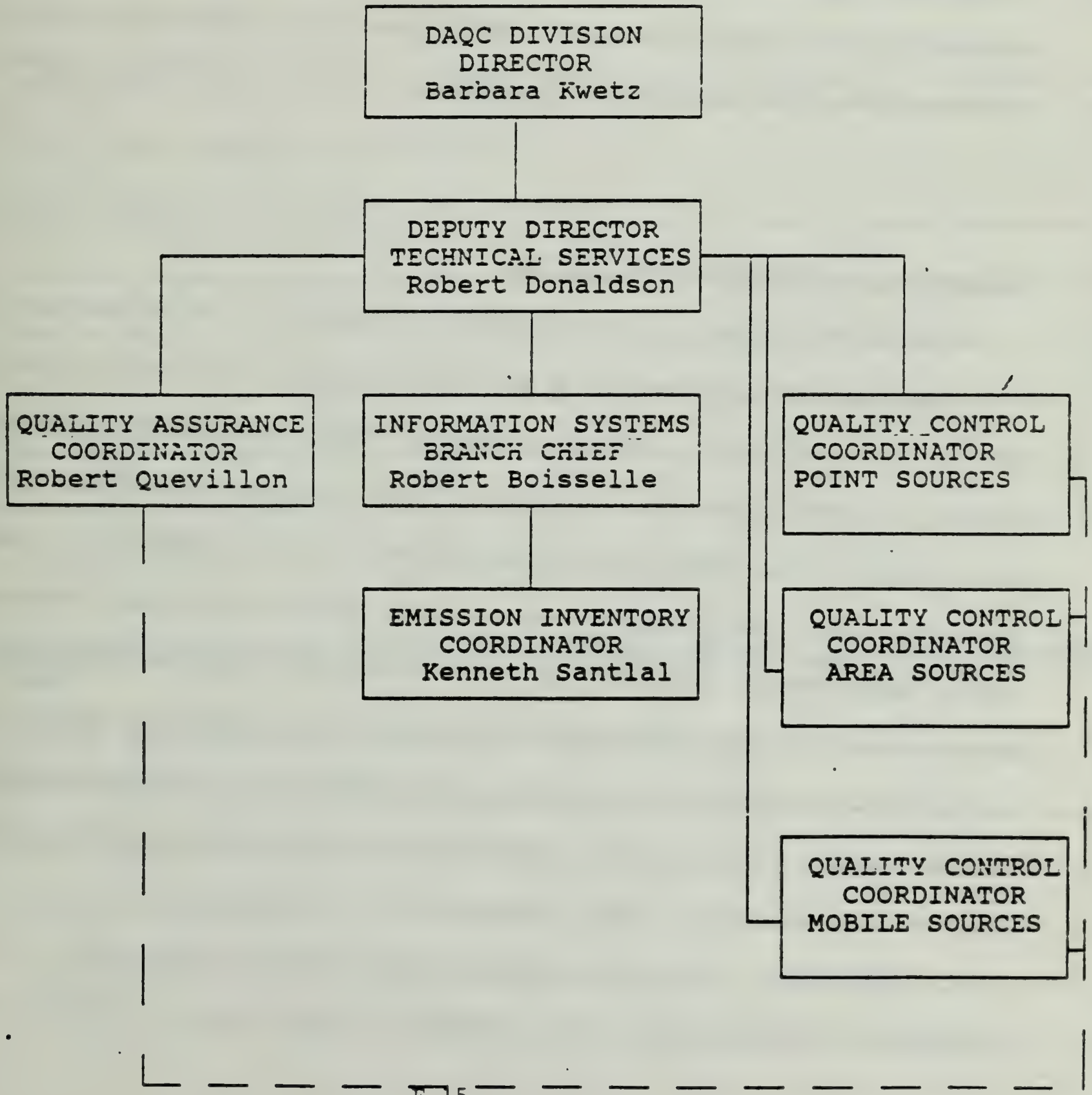
Response to EPA comment no. 22

In the case of point sources, quality control is applied on an ongoing basis such that personnel in the DEP-DAQC-ISB and regional offices manually recalculate the emissions of several sources in each region and compare the manually recalculated results with the emission results contained in SSEIS.

In the case of area sources, Quality Control will be applied once the draft 1990 Base Year Emissions Inventory becomes available. At that time a level I check will be performed on each category and sub-category of emission source. Also on an ongoing basis, up to 10 percent of the data in the area source inventory will be manually recalculated and compared to the data in the inventory.

In the case of mobile sources, Quality Control will be applied once the draft 1990 Base Year Emissions Inventory becomes available. At that time a comprehensive review of the VMT data and emissions calculations will be performed. Quality Control Personnel will be assigned the task of independently recalculating mobile emissions using the same sources of VMT data and emissions factors as was originally used.

Response to EPA comment no. 23


DAQC DIVISION DIRECTOR Barbara Kwetz
DEPUTY DIRECTOR TECHNICAL SERVICES Robert Donaldson
QUALITY ASSURANCE COORDINATOR Robert Quevillon
INFORMATION SYSTEMS BRANCH CHIEF Robert Boisselle
EMISSION INVENTORY COORDINATOR Kenneth Santlal
QUALITY CONTROL COORDINATOR POINT SOURCES
QUALITY CONTROL COORDINATOR AREA SOURCES
QUALITY CONTROL COORDINATOR MOBILE SOURCES

Response EPA to comment no. 24

Data completeness for Point sources will be assessed by comparing master source lists provided by the DEP-DAQC-Information Systems branch to the information contained in the SSEIS data base.

Data completeness for area sources will be verified by comparing the area source classifications covered in the inventory to EPA guidance documents.

Data completeness for mobile sources will be verified by comparing the mobile source classifications covered in the inventory to EPA guidance documents.

Response to EPA comment no. 25

Double-counting is predominately a problem which occurs in overlapping categories such as dry-cleaning and degreasing which can be classified as either point or area sources depending upon size. To avoid double-counting, point source emissions are subtracted from area source emissions. For a particular category the relative contribution as an area source will be determined by using employment figures from publications such as "County Business patterns" and applying scaling-up formulas which will result in a calculation of the category area source emission contribution while at the same time subtracting out the point source component for the category.

In addition, the non-highway mobile source category will be carefully scrutinized and compared to the highway mobile source category to insure that no source classification is inadvertently omitted, mis-classified or double-counted.

Response to EPA comment no. 26

The following tracking form will be used to identify missing and/or incorrect data and document corrective actions taken:

MISSING/INCORRECT DATA TRACKING FORM

THIS SECTION TO BE COMPLETED BY PERSON WHO LOCATED ERROR

SOURCE CATEGORY (POINT/AREA/MOBILE)______________________________

SOURCE CLASSIFICATION____

PERSON WHO IDENTIFIED ERROR______________________________________

DATE WHEN ERROR WAS DETECTED_____________________________________

DESCRIBE TYPE AND LOCATION OF ERROR______________________________

____

____

____

____

____

____

THIS SECTION TO BE COMPLETED BY PERSON RESPONSIBLE FOR CORRECTING ERROR

PERSON RESPONSIBLE FOR CORRECTING ERROR__________________________

DATE NOTIFIED OF ERROR____

DATE CORRECTIVE ACTION TAKEN_____________________________________

DESCRIBE CORRECTIVE ACTION TAKEN_________________________________

____

____

Response to EPA comment no. 27

For point sources data management is accomplished by the use of a sophisticated computerized software package known as the Stationary Source Enforcement Inventory System (SSEIS). SSEIS is accessible to all authorized users (via password protection) through a Department wide local area network known as BANYAN. Compliance personnel in the four (4) regional DEP offices are responsible for the entry of the point source data into the SSEIS database. Personnel in the DEP-DAQC Information Systems Branch (ISB) review the contents of the SSEIS database and provide feedback to the regional offices in regards to data completeness and integrity. This feedback is in the form of printouts which list categories of problems found and sources which fall into these categories.

For area sources data management is simplified in the sense that single individual within the DEP-DAQC-ISB is predominately involved in the development and calculation of the emissions in this category. Lotus 123 is predominately used to calculate and summarize area source emission calculations. However, for some area source classifications such as emissions from waste water treatment plants specialized software such as SIMS is used to calculate emissions. The results obtained from the specialized software is put into Lotus 123 in order to aid in summarizing the data for the inventory report.

For mobile sources data management is split between the DEP-DAQC-Air Programs Implementation Branch and the DEP-DAQC-ISB. The Area Programs Implementation Branch uses MOBILE 4.1 software and transportation inputs to calculate emission factors and provides these emission factors to personnel in the ISB. The emission factors are then applied to the daily vehicle miles traveled (DVMT) in a Lotus 123 spreadsheet to calculate mobile source emissions by county for submittal to the AMS-PC system.

Response to EPA comment no. 28

The 1990 Base Year Emissions Inventory Report will have an appendix which contains a Quality Assurance Report. This Quality Assurance report will address both Quality Control (QC) and Quality Assurance (QC) efforts. Each QC coordinator will document the results regarding the source category (point, area, or mobile) to which they've been assigned. The Quality Assurance coordinator will review the QC reports and will review the inventory document itself and will write an overall report which summarizes both QC and QA issues and results.

F.3 REQUEST FOR LEVEL OF EFFORT (LOE) CONTRACTOR ASSISTANCE FOR QUALITY ASSURANCE IMPLEMENTATION OF 1990 DRAFT EMISSIONS INVENTORY FOR MASSACHUSETTS.

Draft

WORK ASSIGNMENT

I. Title

Quality Assurance for the Massachusetts 1990 Draft SIP Inventory for Carbon Monoxide and the Precursors of Ozone

II. Technical Representative

Tom McCusker
Work Assignment Manager
Control Technology and Compliance Section
Air, Pesticides and Toxic Substances Branch
U.S. EPA Region I
JFK Federal Building
Boston, Massachusetts 02203

APR 10 1992
DIV. AIR QUAL. CONT.

III. Level of Effort

Manhours	150
Duration	1 Month

IV. Background

The Commonwealth of Massachusetts, Department of Environmental Protection (DEP), Bureau of Waste Prevention (BWP), Division of Air Quality Control (DAQC) is charged with developing a complete, accurate, consistent and comprehensive base year emissions inventory in accordance with Title I of the Clean Air Act, Amendments of 1990 enacted on November 15, 1990. A draft base year inventory is required to be submitted to the U.S. Environmental Protection Agency by May 1, 1992.

On July 31, 1991, a draft Inventory Preparation Plan (IPP) was submitted by the Commonwealth of Massachusetts to EPA for review and comment. On October 1, 1991, EPA provided written comments on the IPP, most of which concerned the Quality Assurance (QA) aspects of the IPP. On February 12, 1992, a final IPP was submitted by the Commonwealth of Massachusetts addressing EPA's comments; the IPP was accepted as complete by EPA.

The Massachusetts DEP requests that a Level of Effort (LOE) contract be awarded to perform Quality Assurance on the draft inventory. Quality Assurance performed by an independent auditor will help to improve user and department confidence in the data. This effort will help to ensure that the emissions database prepared for the Commonwealth of Massachusetts is of the highest quality, providing a solid foundation for future control strategies and programs for attainment of the air quality standards for Ozone and CO.

V. Statement of Work

1. The contractor shall perform a QA review on the draft Massachusetts 1990 base year emissions inventory to ensure the development of a complete, accurate and comprehensive emissions database. The contractor shall utilize, but not be limited to, the following EPA QA guidance materials in performing this review:

   a. "Quality Review Guidelines for 1990 Base Year Emission Inventories;" EPA-450/4-91-022, September 1991.

   b. "Quality Assurance Program for Post-1987 Ozone and CO State Implementation Plan Emission Inventories;" EPA-450/4-89-004, March 1989.

   c. "Guidance for the Preparation of Quality Assurance Plans for Ozone/CO SIP Emission Inventories," EPA-450/4-88-023, December 1988.

2. The contractor shall ensure that the draft E.I. has been developed in accordance with EPA guidance documents for preparing Emission Inventories, including but not limited to the following documents:

   a. "Emission Inventory Requirements for Ozone and CO State Implementation Plans," EPA-450/4-91-010, EPA-450/4-91-011, March 1991.

   b. "Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume 1: General Guidance for Stationary Sources;" EPA-450/4-91-016, May 1991.

   c. "Interim Guidance for the Preparation of Mobile Source Emission Inventories - Volume IV," EPA Office of Mobile Sources, Ann Arbor, Michigan, OAQPS, RTP NC. February, 1992

3. The contractor should first perform a Level I QA review as described in the QA guidances which is a global check to ensure that the inventory meets the minimum requirements of the EI requirements guidances.

4. The contractor shall also perform a Level II QA review to ensure that the emission inventories follow the procedures of these guidelines for the preparation of point, area, mobile and biogenic sources. The contractor shall ensure that the most appropriate activity data, emission factors, and emission estimation methodologies are utilized and fully documented and referenced. The contractor shall ensure that any deviation from EPA's guidance methodologies in the inventory is fully documented and justified.

5. The contractor shall have a good working knowledge of computer data bases such as DAQC-SSEIS, AIRS-AMS, and SAMS. The contractor shall also be able to utilize personal computer programs such as Lotus 123 spreadsheets and emission models such as BEIS, SIMS, LAEM and Mobile 4.1

6. The contractor shall ensure that all source categories are covered in the point, area and mobile source sections of the inventories. Missing categories should be reported and any evidence of double counting should be documented. Emission calculations should be checked for errors in order to ensure data accuracy and completeness. Activity data collection should be reviewed for accuracy in coding.

Deliverables

1. A QA report is to be prepared in accordance with the EPA/QA guidelines by the contractor with recommendations, corrections and general appraisal of the emission inventories.

2. The checklist within the QA review guidelines shall be filled out and submitted in order to make revisions to the emission inventories.

3. The contractor shall produce all materials developed for QA in hardcopy and Wordperfect (Version 5.1) and Lotus 123 Spreadsheets on IBM-compatible PC using 3.5 inch high density floppy diskettes.

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APPENDIX

MASSACHUSETTS 1990 BASE YEAR EMISSION INVENTORIES

VOLATILE ORGANIC COMPOUND
NITROGEN OXIDES
CARBON MONOXIDE

DEP

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL

APPENDIX

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APPENDICES

A. STATIONARY POINT SOURCES
B. STATIONARY AREA SOURCES
C. ON ROAD MOBILE SOURCES
D. NON ROAD MOBILE SOURCES
E. BIOGENIC SOURCES
F. QUALITY ASSURANCE
G. APPENDICES
H. ELECTRONIC DISKETTES

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EN.

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APPENDICES A

POINT SOURCES

A.1 POINT SOURCES REGULATION
A.2 SOURCE REGISTRATION FORM
A.3 POINT SOURCE CATEGORIES
A.4 SAMS PRINTOUTS

FEB [illegible]

APPENDIX A.1

310 CMR

7.12 U Inspection Certificate. Record Keeping and Reporting

(1) General Applications

(a) Any person owning, operating, or controlling a facility described in 310 CMR 7.12(3) through (7) shall register on a form obtained from the Department such information as the Department may specify including:

1. the nature and amounts of emissions from the facility,
2. information which may be needed to determine the nature and amounts of emissions from the facility, and
3. any other information pertaining to the facility which the Department requires.

(b) Information required by 310 CMR 7.12(1)(a) shall be submitted annually for any major stationary source (major facility) and once every three years for all other facilities (non-major facility).

7.12: continued

(c) The Department may require a facility to provide registration information and may inspect a facility at any time in addition to the times specified in 310 CMR 7.12(1)(b).

(d) Upon verification of the information required by 310 CMR 7.12(1)(a), the Department will review the supplied information. All such emissions data shall be available to the public during normal working hours at the office of the Division of Air Quality Control and at such other offices as the Department may specify. Copies of all information supplied to the Department pursuant to 310 CMR 7.12 shall be retained by the facility owner or operator for three (3) years after the date the report is submitted.

((2) Reserved)

(3) Fuel Utilization Facilities: Any person having control of a fuel burning facility, such as but not limited to a coal, oil, wood, or gas burner, with a rated input capacity in excess of that described below in Table 7.12(3) shall comply with 310 CMR 7.12(1).

TABLE 7.12(3)

FUEL TYPE	MAXIMUM ENERGY INPUT CAPACITY GREATER THAN (Btu/hr)
distillate oil	10,000,000
natural gas	10,000,000
residual oil	10,000,000
solid fuel	3,000,000
used oil fuel	3,000,000
landfill gas	3,000,000

and any other facility(ies) as the Department may require.

) Facilities: Any facility with potential emmissions greater than the following levels shall comply with 310 CMR 7.12(1). such potential emissions shall not include potential emissions from motor vehicles, incinerators or products of combustion from fuel utilization facilities.

(a) two (2) tons/yr. of particulate matter;
(b) two point five (2.5) tons/yr. of oxides of sulfur;
(c) twenty (20) tons/yr. of organic material; or
(d) four point four (4.4) tons/yr. of nitrogen dioxide.

(5) Incinerators: Any person having control of any hazardous waste incinerator or an incineration facility with a capability of reducing in excess of fifty pounds per hour of waste shall comply with 310 CMR 7.12(1).

(6) Any facility which emits an air contaminant subject to a National Emission Standard for Hazardous Air Pollutants under the federal Clean Air Act, as amended, and for which the Department has received delegation from the U.S. Environmental Protection Agency, shall comply with 310 CMR 7.12(1).

(7) The Department may, for the purpose of conducting a continuing inventory of air pollution source emissions, require any person owning, operating or controlling an air contamination facility not included in 310 CMR 7.12(3) through (6), to register such source in accordance with 310 CMR 7.12(1).

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL

DEP - SOURCE REGISTRATION - 1991

1. SOURCE NAME: ____________________
2. STREET: ____________________
3. CITY: ______________ ZIP: ________

4. MAILING ADDRESS: ____________________
CITY: ______________ ZIP: ________
5. CONTACT: ____________________
6. TELEPHONE: (___)-___-____

GENERAL PLANT INFORMATION

7. SOURCE DESCRIPTION: ____________________
8. SIC CODE: ____________
9. NUMBER OF EMPLOYEES: ____________
10. REPORTING REQUIREMENTS: Y__ N__
11. TUR REPORTING: Y___ N___
12. EPA ID NUMBER: ____________
13. REMARKS: ____________________

DEP - USE ONLY

MAILING LABEL

INSPECTION DATE: __/__/__ (YY/MM/DD)
PRIORITY CATEGORY: ____________
INDUSTRIAL CLASS: ____________
OWNERSHIP: P L S F U E
SOURCE CLASS CODE: A1 A2 B
AIR PROGRAM STATUS: ____________
UTM'S HORZ ________ VERT ________
CEM EQUIPMENT: YES ___ NO ___

COMMENTS: ____________________

CERTIFICATION: I certify that I have completed the above and to the be
14. my knowledge it is true and complete.

SIGNATURE: ____________________ TITLE: ____________

APPENDIX

INSTRUCTIONS FOR COVER SHEET

Complete the left side and certification only.

1. **SOURCE NAME:** The actual facility name, not the corporate name, if different from mailing label.
2. **STREET:** The physical location of the plant, if different from mailing label
3. **CITY-ZIP:** Nine digit zip code, if known. City name and nine digit zip code, if different from mailing label.
4. **MAILING ADDRESS:** The corporate name and physical location, if different from above.
5. **CONTACT:** A person located within the plant who is completing the forms, or a responsible officer of the facility, if different from mailing label.
6. **TELEPHONE:** For the person named as contact.
7. **SOURCE DESCRIPTION:** List the major items produced at this facility.
8. **SOURCE INDUSTRIAL CLASSIFICATION CODE (SIC):** May be found on Federal Tax Return.
9. **NUMBER OF EMPLOYEES:** Total number of employees working at the facility.
10. **TUR REPORTING:** Are you required to report under the Toxic Use Reduction Act (MGL 21I).
11. **REPORTING REQUIREMENT:** Are you required to report to D.E.P. monthly quarterly or semi-annually?
12. **EPA IDENTIFICATION NUMBER:** If your facility has been assigned an EPA identification number, please enter this number. The EPA I.D. number is a 12 digit number. If your facility does not have an EPA I.D. number, enter (N/A).

13. **REMARKS:** Any additional information you think may be helpful in determining your plant's impact on air pollution.

14. **CERTIFICATION:** This form must be signed by a responsible official at the location. If an agent has been designated to fill out this form, the responsible official must check and sign this form. (See definitions in 310 CMR 7.00)

NOTE: Send **ORIGINAL** to **local** D.E.P. office and retain copy.

Local Department of Environmental Protection Office:

Department of Environmental Protection
Division of Air Quality Control
Metropolitan Boston/Northeast Region
10 Commerce Way
Woburn, MA 01801

(617) 935-2160

1991

AP-1 COMMONWEALTH OF MASSACHUSETTS DEP-1991
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL

FUEL BURNING EQUIPMENT REGISTRATION

(1) SOURCE NAME ______________________________.
SEND ORIGINAL TO LOCAL DEP OFFICE,RETAIN COPY.

FUEL BURNING EQUIPMENT	Stack no.__ Equip.no.__	Stack no.__ Equip no.__	Stack no.__ Equip.no.__	DEP USE ONLY
(2)				
Type	________	________	________	
Manufacturer	________	________	________	
Model number	________	________	________	
a.Rating (MMBtu/HR)	________	________	________	
Date in Service	________	________	________	
DEP-APPROVAL #	#________	#________	#________	
(3) FUEL USED				
Type-see instruction	________	________	________	
Grade - #2,#4,etc	________	________	________	
	________	________	________	
Sulfur Content %	________	________	________	
Ash Content	________	________	________	
Annual Usage Amount (Jan 1 - Dec 31)	________	________	________	
Units:	________	________	________	
% Used for Heating	________	________	________	
(4) FUEL SUPPLIER				
Name	________	________	________	
City or Town	________	________	________	
(5) BURNER EQUIPMENT				
Type of Burner	________	________	________	
Manufacturer	________	________	________	
Maximum Hourly Firing Rate	________	________	________	
Date Installed	__/__	__/__	__/__	
DEP-APPROVAL #	# ______	# ______	# ______	
Operating Hours				
hrs/day	__	__	__	
days/wk	__	__	__	
wks/yr	__	__	__	
hrs/yr	__	__	__	
APPENDIX DEP USE-STK/PT/SEG	___/___/___	___/___/___	___/___/___	

FUEL BURNING EQUIPMENT REGISTRATION FORM AP-1 (PART 2) DEP-1991

STACK INFORMATION	Stack no.__	Stack no.__	Stack no.__	DEP USE ONLY
(6)				
Diameter @ Top (feet)	________	________	________	
Height (feet)	________	________	________	
Breeching Temperature ° F	________	________	________	
Lining of Stack	________	________	________	
Exhaust Velocity	________	________	________	
Soot Blowing	________	________	________	
times/day	__	__	__	
AM/PM or Both	__	__	__	
times/week	__	__	__	
(7) SMOKE INDICATOR				
Name	________	________	________	
Model no.	________	________	________	
Recorder (yes or no)	________	________	________	
Audible Alarm (yes or no)	________	________	________	
Date Service	__/__/__	__/__/__	__/__/__	
(8) AIR POLLUTION CONTROL EQUIPMENT				
Type	________	________	________	
Control Efficiency	__.__ %	__.__ %	__.__ %	
Date Installed	__/__/__	__/__/__	__/__/__	
D.E.P.APPROVAL #	# ________	# ________	# ________	
DEP USE STK/PT/SEG	___/___/___/	___/___/___	___/___/___	

REMARKS:

CERTIFICATION: I certify that I have completed the above and to
(9) the best of my knowledge it is true and complete.

SIGNATURE: ____________________ TITLE: ____________________
PRINT NAME: ____________________ DATE : ____/____/____

INSTRUCTION SHEET FOR FUEL-BURNING EQUIPMENT REGISTRATION FORM AP-1

This form must be completed for all fuel burning equipment (oil, gas, coal, etc.). Complete one column for each separate unit. **NOTE:** Any fuel burning facility having a total energy input capacity less than the threshold contained in 3 CMR 7.12(3) is not required to submit AP-1 unless required by the Department.

1. **SOURCE NAME:** Same as item #1 of cover sheet.

2. **FUEL BURNING EQUIPMENT:**

   STACK NUMBER: The number you use to identify this stack.

   EQUIPMENT NUMBER: The number you use to identify each unit of equipment connected to the above stack.

   TYPE: What is this piece of equipment? (i.e., boiler, oven, dryer, space heater, emergency diesel generators.

   MANUFACTURER: Who built this unit?

   MODEL NUMBER: The manufacturer's model number and rating in MMBtu/Hr. input.

   DATE IN SERVICE: The initial start-up date for this unit (month, day, year).

   D.E.P. APPROVAL NUMBER: This number may be found on your approval letter from D.E.P. to construct/modify/operate such equipment or if installed in accordance with 7.02(4)(a) or 7.02 answer by writing N/A.

3. **FUEL USED:**

   TYPE: Oil, natural gas, propane, coke, wood, anthracite coal, waste oil, waste solvent, etc.

   GRADE #2, #4, #6 ETC. The grade of oil burned--this information may be obtaiend from your supplier.

   SULFUR CONTENT: Percentage of sulfur in the fuel may be obtained from your supplier.

ASH CONTENT: Percentage of ash in the fuel may also be acquired from your supplier.

ANNUAL USAGE: The amount of fuel this unit used during the calendar year (January 1-December 31) in units:

TYPE	UNITS
oil	gallons
gas	cubic feet
coke	tons
wood	tons
coal	tons
* waste oil	gallons
* waste solvent	gallons

% USED FOR HEATING: What percentage is used for heating/cooling from 0-99.9%

4. **FUEL SUPPLIER**

NAME: Who supplies the fuel for this fuel utilization facility.

CITY/TOWN: Address of fuel supplier

5. **BURNING EQUIPMENT**

TYPE OF BURNER: Rotary cup, Mechanical Atmomizer, Steam Atomizer, Air Atomizer, Other - please describe.

MANUFACTURER: The name of the manufacturer of the burner.

MAXIMUM HOURLY FIRING RATE: The maximum this burner can fire in one hour, as specified by the manufacturer and as approved by the D.E.P. (Ex. gal./hr. - (1), cubic feet/hr. - (2), ton/hr. - (3)).

DATE INSTALLED: A four digit date when the burner was installed (YYMM).

* Please provide a lab analysis of any waste oil burned. Burning of such oil must be in accordance with the regulations and requires a permit from the Division of Air Quality Control and the Division of Hazardous Waste.

D.E.P. APPROVAL # This number may be found on your approval letter from D.E.P. to construct/modify/operate such equipment or if installed in accordance with 7.02(a) or 7.03 answer by writing N/A.

OPERATING HOURS: The time period the equipment was used:

hours per day 1-24
days per week: 1-7
weeks per year: 1-52
hours per year: 8760

6. **STACK INFORMATION:** Complete column for each stack.

DIAMETER @ TOP (FT): Give the inside diameter (ID) of the stack at its exit point in feet and inches. If the stack is not circular give the inside length and width of the stack at the exit point.

HEIGHT (FT): Height above ground level.

BREECHING TEMPERATURE (F): What is the temperature of the exhaust going into the stack?

LINING OF STACK: What material was used to construct the inside of the stack?

EXHAUST VELOCITY: How fast does the exhaust exit the top of the stack in feet per second (fps)?

SOOT BLOWING: Do you blow soot in order to clean the tubes, yes or no? If yes, do you use steam or air, how many times a day? When? In the morning (AM) or afternoon (PM) or both? How many times a week is this scheduled?

7. **SMOKE INDICATOR:**

NAME: Manufacturer

MODEL NUMBER: Manufacturer's model number

RECORDER: Is this unit equipped with a paper recorder - yes or no?

AUDIBLE ALARM: Is this unit equipped with an audible alarm yes or no?

DATE SERVICED" Date unit was last serviced, mm/dd/yy.

8. AIR POLLUTION CONTROL EQUIPMENT

TYPE: ESP, baghouse, cyclone, scrubber, afterburner, adsorber, etc., that controls emission from this fuel burning equipment.

TOTAL EFFICIENCY: From 0-99.9% as suggested by the manufacturer or establish through recent stack test.

DATE INSTALLED: The month, day, year that the air pollution contgrol unit was operational.

DEP APPROVAL #: This number may be found on your approval letter from D.E.P. to construct/modify/operate such equipment or if installed in accordance with 7.02(a) or 7.03 answer by writing N/A.

CERTIFICATION: This form must be signed by responsible official at the location. If an agent has been designated to fill out this form, the reponsible official must check and sign this form. (See definition in 310 CMR 7.00)

Note: Send Original to Local D.E.P. Office, Retain Copy

1991

AP-2 COMMONWEALTH OF MASSACHUSETTS DEP-1991

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY CONTROL

PROCESS/MANUFACTURING REGISTRATION

(1) SOURCE NAME: ______________________ (2) CITY/TOWN: ______________________

(3) PROCESS NAME			
DESCRIPTION OF PROCESS (4)			
TYPE OF EQUIPMENT USED (5)			
(6) DATE IN SERVICE			
LOCATION OF EQUIPMENT (7)			
(8) DEP APPROVAL #			
(9) RESTRICTIONS (DEP)			
(10) MATERIAL-Raw Type			
TYPE			
Max/Hour			
Total/Yr			
Units:			
(11) MATERIAL-FINISH			
TYPE			
Max/Hour:			
Total/Year:			
Units:			
(12) OPERATING SCHEDULE			
Hours/Day			
Days/Week			
Weeks/year			
APPENDIX [illegible] STK/PT/SEG	____/____/____	____/____/____	____/____/____

PROCESS/MANUFACTURING REGISTRATION FORM AP-2 (PART-2) DEP-1991

(13) STACK DATA			
Stack No.			
Vertical/Horizontal			
Inside Dia. @ Top			
Height above ground			
Exit Temperature °F			
(14) EMISSION CONTROL			
Type			
Efficiency (%)			
Manufacturer			
Date Installed			
DEP-Approval #	#	#	#
(15) EMISSIONS			
Type Emitted			
Total/Year (Tons/yr)			
DEP USE STG/PT/SEG	____/____/____	____/____/____	____/____/____

NOTE: Attach a current roof diagram indicating stack locations and identification numbers.

REMARKS:

CERTIFICATION: (16) I certify that I have completed the above and to the best of my knowledge it is true and complete.

SIGNATURE : ______________________________

PRINT NAME: ______________________________

TITLE: ____________________

DATE : ____/____/____

INSTRUCTION SHEET FOR
PROCESS MANUFACTURING REGISTRATION
FORM AP-2

All processes or manufacturing operations which result in air contaminants being discharged into the ambient air (directly or indirectly) must be reported. The contaminants may be, but are not limited to, particular matter (any material that exists in a finely divided form as a liquid or solid at standard air temperature, humidity and pressure), sulfur oxides, carbon monoxide, nitrogen oxides, lead, asbestos, beryllium, mercury, vinyl chloride, volatile organic compounds (VOC), Halogenated Organic Compounds (HOC).

Indicate in emission section pertinent properties of the pollutant stream (i.e., gas, fume, mist, associate odor).

If the process and/or manufacturing operations involve fuel burning equipment, also submit on AP-1. If fuel burning equipment is used as an air pollution control system, list on AP-2 (ITEM 13) and submit on AP-1.

Liquid organic material used as an integral part of a process or handled in a manner which exposes the organic material to the air (i.e., heating, blending, or mixing), must be reported. Storage for liquids which contain VOC, HOC and/or a blend of VOC/HOC's should be registered on the AP-4 form. VOC and HOC usage and emissions must be listed on AP-5.

1. **SOURCE NAME:** Same as Item #1 of cover sheet.

2. **CITY/TOWN:** Print name of city/town where firm is located.

3. **PROCESS NAME:** Use name of process that you describe the typical process or manufacturing operation being performed in this process step (i.e., Fabric Finishing; Rubber Compounding.)

4. **DESCRIPTION OF PROCESS:** Brief description of process with equipment used (i.e., Immersion in Mineral Spirits and Oven dried.)

5. **TYPE OF EQUIPMENT USED:** Use names typical to the process to identify equipment. All stationary pneumatic systems that handle, convey, or collect solid materials and storage silos must be reported.

6. **DATE IN SERVICE:** The original date this unit started being used at this facility (Month, Day, Year).

7. **D.E.P. APPROVAL NUMBER:** This number may be found on your approval letter from D.E.P. to construct/modify/operate such equipment or if installed in accordance with 7.02(4)(a) or 7.03 answer by writing N/A.

8. **LOCATION OF EQUIPMENT:** Provide the plant and building identification number and floor number where the equipment being registered is located.

9. **RESTRICTIONS:** Are there any restrictions placed on process by D.E.P. approval letter? (Type of restrictions a process might have include maximum raw material thruput, maximum production rate, maximum operating hours.)

10. **MATERIAL RAW TYPE:** State material used in, or processed through this equipment at its maximum design rate. Give the maximum design rate in measurable units such as maximum pounds of material applied or processed per hour, or maximum gallons, (please specify units on form).

11. **FINISHED MATERIAL:** State the end product of this equipment in measurable units (please specify units on form).

12. **OPERATING SCHEDULE:** Give the hours, days and weeks of normal operation of the equipment being registered. Estimate if exact numbers are not known.

13. **STACK DATA:**

The following information should pertain to each stack or vent that exhausts emission from the process or manufacturing equipment identified in this column.

STACK NUMBER: Number each stack that is to be registered to aid in identifying the points of emissions and to use in referencing the information detailed in this column.

VERTICAL/HORIZONTAL: Indicate position of stack from ground level.

INSIDE DIAMETER AT TOP: Give the inside diameter (I.D.) of the stack at its exit point in feet and inches. If the stack is not circular, give the length and width of the inside of the stack at the exist point.

STACK HEIGHT: Give the height of the stack as measured from ground level. For example, if the stack is 100 feet, with 10 feet below outdoor ground level (because it is in the basement), the stack height, as measured from ground level is 90 feet.

EXIT TEMPERATURE (oF) This is the breeching gas temperature, the temperature at which the exhaust gases enter the stack.

GAS QUANTITY: This is the actual cubic feet of air exhausted from the process in one minute at the gas temperature indicated.

14. **EMISSION CONTROL:**

TYPE: "End of Process" Emission Reduction. Examples of control systems are: baghouses (fabric filter), electrostatic precipitators (ESP), cyclones, wet scrubbers, packed towers, fume incinerators, venturi scrubbers, settling chambers, carbon adsorption units, vapor condensers, packed tower adsorption units.

TOTAL EFFICIENCY: All air pollution control equipment has been designed to achieve a certain degree of performance, usually stated as a percent of overall control efficiency of removal of the pollutant.

MANUFACTURER: The name of the manufacturer of the equipment.

D.E.P. APPROVAL #: This number may be found on your approval letter from D.E.P. to construct/modify/operate such equipment or if installed in accordance with 7.02(4)(a) or 7.03 answer by writing N/A.

15. **CERTIFICATION:** This form must be signed by a responsible official at the location. If an agent has been designated to fill out this form, the responsible official must check and sign this form.

NOTE: Send **ORIGINAL** to local D.E.P. office, retain copy.

SR-1/dep.11/1/91

AP-3 DEP-1991

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL

INCINERATOR REGISTRATION

(1) SOURCE NAME: ____________________ (2)D.E.P. APPROVAL # ____________

EQUIPMENT	Manufacturer: ____________	D.E.P Approval Date: __/__/__	
(3)	Model Number ____________	Date Installed: __/__/__	
	Heat Recovery ___	No. of Hearths ___	Total Hearth Area ____
	Fuel Used: ____________	Annual Usage (gal or ft): ____________	
	Automatic Feeder Used: ____________	Operating Schedule : Hrs/Day __ Days/Week __ Weeks/Year __ # of charges per day: ______	
	Operating Procedures Posted _________		
	Temperature (°F) Primary Chamber: ______ 2nd Chamber: _______ Retention time in 2nd Chamber: ____________		
(4) STACK	Height: ___(ft)	Diameter: __(ft)	Temperature: ____________°F
(5) BURNER	Manufacturer____________ Model #:__________Fuel_____ Primary:__________(Btu/HR)	Manufacturer____________ Model #:____________Fuel_____ Secondary:____________(Btu/HR)	
(6) WASTE	Type	Max.Pounds/Hour	Tons/Year
	____________	____________	____________
	____________	____________	____________
Control Equipment (7)	Primary Secondary Efficiency Type: ____________ Manufacturer:____________ ____________ Installed: __/__/__ __/__/__		
MONITORING EQUIPMENT (8)	Manufacturer:____________ Model Number:____________ Purpose of Monitoring:____________ Installed: __/__/__ Comments:____________		
DISPOSAL of ASH (9)			
REMARKS (10)			
DEP USE STK/PT/SEG : ____/____/____			
CERTIFICATION: (11)	I certify that I have completed the above and to the best of my knowledge it is true and complete.		
SIGNATURE : ____________________ PRINT NAME: ____________________	TITLE: ____________ DATE: ____/____/____		

APPENDIX

SOLID WASTE CL[illegible]IFICATION

TYPE WASTE	MATERIAL CLASS.	ACTIVITY	WASTE MATERIAL DESCRIPTION	PERCENT MOISTURE BY WEIGHT	DENSITY LBS/CU.YD.	PERCENT ASH BY WEIGHT	HEAT CONTENT BTU/LB
0	Trash	Commercial Industrial	Highly Combustible Mixture such as paper, carboard cartons, wood boxes & floor sweepings. May contain up to 10% by weight of plastic bags, coated paper, laminated paper, treated corrugated carboard, oily rags, and plastic or rubber scraps.	10%	270	5%	8,500
1	Rubbish	Domestic Commercial Industrial	Combustible waste mixture such as paper, carboard cartons, wood scrap, follage and floor sweepings. May contain up to 20% by weight of restaurant waste, but contains little or no treated paper, plastic or rubber wastes.	25%	270	10%	6,500
2	Refuse	Domestic	Even mixture of trash and garbage by weight.	50%	540	7%	4,300
3	Garbage	Restaurants Hotels Hospitals	Animal and vegetable wastes.	70%	945	5%	2,500
4	Patho-logical	Hospitals Laboratories Animal Pounds Slaughter-houses	Human Tissue and animal remains.	85%	1,485	5%	1,000
5	Volatile	Industrial	Gaseous, liquid or semi-liquid waste from industrial operations.		Values to be determined from Materials to be Destroyed		
6	By-Product	Industrial	Solid Waste by products from industrial operations.				

INSTRUCTION SHEET FOR
INCINERATOR REGISTRATION
FORM AP-3

1. **SOURCE NAME:** Same As Item #1 on cover sheet.

2. **D.E.P. APPROVAL #:** This number may be found on your approval letter from D.E.P. to construct/modify/operate such equipment. All incinerators must have approval prior to installation and operation.

3. **EQUIPMENT DATA:**

MANUFACTURE: Print name of manufacture of equipment.
D.E.P. APPROVAL DATE: Date D.E.P. approved incinerator for this firm.

MODEL NUMBER: Number associated with equipment.

DATE INSTALLED: Date equipment was installed at firm.

HEAT RECOVERY: Does the incinerator have a heat recovery unit attached, (Yes or No)?

NO. OF HEARTHS: Self explanatory.

TOTAL HEARTH AREA: Recorded in square feet.

FUEL USED: Type of fuel used (oil, gas).

ANNUAL USAGE: Annual quantity of fuel used in gallons, or ft3.

AUTOMATIC FEEDER: Is waste fed to incinerator automatically (Yes or No)?

OPERATING SCHEDULE: The operating schedule should be indicated in hours/day, days/week and weeks/yr. The number of times per day the unit is charged with material for incineration.

STANDARD OPERATING PROCEDURE: Is the Standard Operating Procedures (SOP) posted, (Yes or No)?

TEMPERATURE (°F) PRIMARY + SECONDARY CHAMBERS: Maximum temperature during incineration. The retention time should be indicated in seconds.

4. **STACK:**

HEIGHT: Give the height of the stack as measured from ground level.

DIAMETER: Give the inside diameter (ID) of the stack at its exit point.

TEMPERATURE: This is the breeching gas temperature, the temperature at which the exhaust gases enter the stack. (°F)

5. **BURNER:**

MANUFACTURER: Who made these units?

MODEL NUMBER: The manufacturer model number and rating in MMBTU/HR input and fuel used.

Primary & Secondary Rating: This information can be found on the nameplate or by asking your burner maintenance contractor (hourly maximum firing rate in Btu/hr).

6. **WASTE:**

WASTE TYPES: Indicate the type and amount (lbs/hr and tons/yr) of thru 6 waste.

0 Trash
1 Rubbish
2 Refuse
3 Garbage
4 Pathological
5 Volatile
6 By-Product - Explain/Describe

REFER TO SOLID WASTE CLASSIFICATION SHEET ON BACK OF AP-3 FORM.

7. **CONTROL EQUIPMENT:**

TYPE: Primary + Secondary Control equipment on site - Ex.: scrubber, ESP, etc.

MANUFACTURER: Print name of manufacturer.

TOTAL EFFICIENCY: From 0-99.9% as suggested by manufacturer or estrablished through recent stack tests.

DATE INSTALLED: When was unit installed on site? (M/DD/YY)

8. **MONITORING EQUIPMENT:**

MANUFACTURER: Print name of manufacturer and monitoring equipment in stack. Ex: Temperature sensors, gas/smoke sensors.

MODEL NO.: Self explanatory

PURPOSE: What is the purpose of monitoring equipment. Ex. Smoke, SO_2, VOC, TSP, etc.

INSTALLED: Self explanatory

9. **DISPOSAL OF ASH:** Give disposal method for ash and material collected by emission control equipment.

10. **REMARKS:** Use this space to clarify any entries above if needed and state if incinerator is currently in use.

11. **CERTIFICATION:** This form must be signed by a responsible official at the location. If an agent has been designated to fill out this form, the responsible official must check and sign this form.

NOTE: Send ORIGINAL to local D.E.P. Office, retain copy.

AP-4 DEP-1991

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL

LIQUID ORGANIC MATERIAL STORAGE

(1) SOURCE NAME: ________			(2) CITY/TOWN: ________	
(3) STORAGE (above ground)	Type: ________		Identification no: ________	
	Age: __	Diameter: ____	Height: ____	Color: ________
	Capacity: ________		Construction Type: ________	
UNDERGROUND (4) TANK	Year Installed: ____		DPS Permit: Yes ______ No ______	
	Capacity: ________		Construction Type: ________	

MATERIAL STORED (5)	Name	CAS No.	Amt Purchase (gals)	Thruput Amount (gals)
	1 ________	________	________	________
	2 ________	________	________	________
	3 ________	________	________	________
	4 ________	________	________	________
	5 ________	________	________	________
	6 ________	________	________	________
	7 ________	________	________	________

(6) CONTROL EQUIPMENT	Filling	Type: ________	Efficiency: __ %
	Withdraw	Type: ________	Efficiency: __ %
	Storage	Type: ________	Efficiency: __ %

(7) REMARKS

DEP USE STK/PT/SEG ____/____/____

CERTIFICATION: (8) I certify that I have completed the above to the best of my knowledge, it is true and complete.

SIGNATURE : ________

TITLE : ________

PRINT NAME: ________

DATE : ____/____/____

INSTRUCTION SHEET FOR
LIQUID ORGANIC MATERIAL STORAGE
FORM AP-4

This form is to be completed for each storage container with information concerning all "Organic Material", meaning any compound of Carbon (excluding Carbon Monoxide, Carbon Dioxide, Carbonic Acid, Metallic Carbides or Carbonates, Ammonium Carbonate.

All liquid organics that are shipped to or from this facility by bulk transfer must be reported. If this material is used in processing or manufacturing, i.e., surface coating (paint, varnish, lacquer, etc.), laundries (drycleaning agents), and/or industrial process (polymerization, blending dilution, etc.) this use must be reported on Form AP-2 Process/Manufacturing Equipment and Form AP-5 VOC and HOC Compound Usage and Emissions.

1. **SOURCE NAME:** Same as Item #1 on cover sheet.

2. **CITY/TOWN:** Print Name of City/Town where Firm is located.

3. **STORAGE** (Above ground) **TYPE:** Identify the storage container (i.e., storage tanks or 55 gallon drums). Also identify if these storage tanks are mobile such as rail vehicles, tank trucks, etc., and use one form per tank, if they are not identical.

    IDENTIFICATION NO.: Number used by you to identify container if remade specify in REMARKS

    AGE: Number of years the tank has existed.

    DIAMETER: Give diameter in feet.

    HEIGHT: Give height in feet.

    COLOR: Self explanatory.

    CAPACITY: Identify the maximum amount capable of being stored in tank. Units are in gallons.

    CONSTRUCTION: Material to construct tank ex.: steel, fiberglass, etc.

4. UNDERGROUND
(Tank)

YEAR INSTALLED: Self explanatory

DPS PERMITS: Department of Public Safety permit issued to source YES or NO.

CAPACITY: Identify the maximum amount capable of being stored in tank. Units are in gallons.

CONSTRUCTION: Material to construct tank. ex.: steel, fiberglass, etc. also specify if double walled or single.

5. Material Stored

NAME: Identify the specific type of organic material being stored (i.e., alcohol is not a sufficient description - methanol, isopropanol, ethanol, etc. is required). If the material is a combination of organics, identify components.

CAS: Chemical Abstract Service number - see MSDS sheets.

AMOUNT
PURCHASED: Self explanatory

THRUPUT
AMOUNT: Provide data on annual thruput, not the volume purchased, for period being registered (Jan. 2 to Dec. 31).

6. CONTROL EQUIPMENT:

FILLING TYPE
& EFFICIENCY: Indicate the type of vapor control equipment used for filling and its efficiency.

WITHDRAW TYPE & EFFICIENCY: Indicate the type of vapor control equipment for withdrawing and its efficiency.

STORAGE TYPE & EFFICIENCY: Indicate the type of vapor control equipment for storage and its efficiency.

7. REMARKS: Use this space to clarify any entries.

8. CERTIFICATION: This form must be signed by a responsible company official at the location. If an agent has been designated to fill out this form, the responsible official must check and sign this form.

NOTE: Send ORIGINAL to local D.E.P. Office, retain copy.

1991

AP-5 DEP-1991

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL

VOLATILE/HALOGENATED ORGANIC COMPOUND USAGE

(1) SOURCE NAME/ADDRESS		
(2) USAGE NUMBER		
(3) NAME AND DESCRIBE PROCESS		
(4) TYPE OF MATERIAL PROCESS		
(5) AMT. OF MATERIAL PROCESSED/YEAR		
(6) NAME OF VOC/HOC CONTAINING FORMULATION		
(7) ANNUAL USAGE (gals)		
(8) DENSITY OF FORMULATION (lbs/gal)		
(9) TOTAL WEIGHT % VOC/HOC IN FORMULATION		
(10) NAME AND WEIGHT % OF VOC/HOC COMPONENTS		
(11) SOLVENT THINNER ADDED		
A.Chemical Name		
B.Annual Usage (gal)		
C.Density (lbs/gal)		
D.CAS Number		
(12) VOC/HOC OFFSITE DISPOSAL		
A.Amt.disposed-lbs		
B.% VOC/HOC by weight		
C.Wt.of disposed VOC Only		
D.Disposal Method		
(13) VOC/HOC COMBINED IN PRODUCT		
(14) EMISSION CONTROL OF VOC/HOC		
A.Type of ADD-on Control		
B.Overall Efficiency (%)		
C.Wt of VOC/HOC Controlled (lbs)		
(15) EMISSIONS-TONS/YR		
VOC		
HOC		
(16) STACK NUMBER (s)		

(17) CERTIFICATION:
I certify that I completed the above and to the best of my knowledge is true and complete.

SIGNATURE : ____________________ TITLE: ____________________

PRINT NAME: ____________________ DATE: ____/____/____

On another sheet, list the name + address of the companies from whom you purchase,contract to dispose,recover or reclaim VOC/HOC formulations.

INSTRUCTION SHEET FOR VOLATILE/HALOGENATED ORGANIC COMPOUND USAGE AND EMISSIONS REGISTRATION FORM AP-5

This form is to be completed with information concerning all volatile organic compounds and halogenated organic compounds being used in processes at the facility. (See definition sheet for explanation of VOC/HOC).

1. **SOURCE NAME AND ADDRESS:** Legal name and actual location of the facility.

2. **USAGE NO.:** Columns are numbered sequentially. If you use more than one page, renumber the columns. For example, page 2 column headings will be 3, and 4.

3. **NAME AND DESCRIBE PROCESS:** List each process which utilizes VOC/HOCs. Include number and type of process equipment, such as "1-roll coater" or "3-vapor degreasers". Be specific: indicate if air atomized or airless spray, dip coater, roll coater, electrodeposited dip, electrostatic spray; etc. For degreasing equipment, specify the dimensions (LxW).

4. **TYPE OF MATERIAL PROCESSED:** Describe material being coated, cleaned, or processed. Example: metal lamp parts, wood furniture, fabrics, pressure sensitive tape, etc.

5. **AMOUNT OF MATERIAL PROCESSED:** Provide amount of material processed in appropriate units, such as: sq. ft., yards, lbs., or number of units, with a reference to unit size (2000 pos. @ 100# each).

6. **NAME OF VOC/HOC CONTAINING FORMULATION:** Use a name which clearly identifies the formulation which contains the VOC/HOC. It should correspond to the identification on any storage containers, and allow for verification of purchase orders and MSDS sheets. The formulation name and data requested here are as purchased.

7. **ANNUAL USAGE:** To the nearest gallon, give the annual usage of the VOC/HOC-containing formulation for the current reporting period. For the greatest accuracy, note that: beginning of year inventory + purchase - end of year inventory = annual usage.

8. **DENSITY OF FORMULATION:** Lbs/gal for the formulation may be found on the MSDS sheet.

9. **TOTAL WT. % VOC IN FORMULATION:** The total percent of VOC (INCLUDING HOC) BY WEIGHT, not by volume. The total weight percent can be obtained by adding the weight percents of each VOC/HOC component listed in the "hazardous ingredients" section of the MSDS for that formulation, or be contracting your supplier.

10. **VOC/HOC COMPOSITION (CHEMICAL NAME):** Identify the specific VOC/HOC ingredients by chemical name (i.e. toluene, isopropanl, MEK not alcohol") and give weight percent of each. Use the back of this page or separate sheet if necessary.

11. **SOLVENT THINNER:**

    (a) **CHEMICAL NAME:** Explained above

    (b) **ANNUAL USAGE:** Indicate the gallons used in the calendar year.

    (c) **DENSITY:** Lbs./gal. can be obtained from MSDS or supplier.

    (d) **CAS NUMBER:** Chemical Abstract Service Number - See MSDS Sheet.

12. **VOC/HOC DISPOSED OFF SITE:**

(a) **Amt. Disposed:** For any waste stream which contain VOC/HOC, list the total weight of the waste stream, verifiable by shipment records.

(b) **% VOC/HOC by weight:** List the percent by weight of VOC/HOC (s) in the above-mentioned waste stream. If the percent is less than 100%, indicate the minimum percentage of VOC/HOC which you can demonstrate is in this waste and NOT EMITTED TO THE AMBIENT AIR.

(c) **Wt. Of Disposed VOC/HOC only:** [Line 12(a) x Line 12(b)] /100.

(d) **Disposal Method:** Waste Water Treatment Plant, Waste shipment.

13. **VOC/HOC COMBINED WITH PRODUCT:** Indicate the minimum weight of VOC/HOC (in pounds per year) which you can demonstrate is chemically or physically combined with the product and which is NOT EMITTED TO THE AMBIENT AIR. If it is emitted to the atmosphere directly or indirectly at this facility, it may not be included.

14. **EMISSION CONTROL OF VOC/HOC:**

(a) **Type:** End-of-process technology which prevents the emission of VOC/HOC to the ambient air. Examples: carbon adsorption, incinerators (catalytic/thermal), refrigerated condensers.

(b) **Overall Efficiency (%):** The TOTAL control efficiency is a product of the capture efficiency of the exhaust system (percent of the emitted VOC/HOC which are directed to the control device), and the efficiency of the control device itself (percent destruction or removal from the exhaust). Example: if a local exhaust hood over a roll coater captures 90% of the emitted VOC/HOC, and the afterburner control device destroys 95% of the captured VOC/HOC, the total control efficiency would be: (.90) (.95) = 85.5%.

(c) **Weight of VOC/HOC Controlled (Lbs./Year):** This equals the total VOC/HOC input to the process multiplied by the overall fraction controlled, calculated as: [(line 7 x line 8 x (line 9/100)+(line 11b x line 11c)] x [line 14b/100 = lbs VOC/HOC over Year. Weight of VOC/HOC recovered or reclaimed on iste and reintroduced into a process cannot be claimed on line 14c, unless lines 7 and 11 also include recovered as well as virgin VOC/HOC.

15. **VOC/HOC EMISSIONS (TONS PER YEAR):** This is equal to the total VOC/HOC input, minus the amount properly disposed, combined with product, or controlled by add-on equipment. Calculated as: [[(line 7x line 8x (line 9/100))+(line 11b x line 11c) -[line 12c + line 13 + line 14c]] all divided by 2000 = TONS VOC/HOC over Year.

16. **STACK NUMBER (S):** Identify all specific process emission points (use stack numbers on form AP-2). If there is no specific local exhuast stack, indicate emitted through general ventilation (g.v.).

17. **CERTIFICATION:** This form must be signed by a responsible official at the location if an agent has been designated to fill out this form, the responsible official must check and sign the form.

NOTE: Send ORIGINAL to the local D.E.P. office, retain copy.

1991

EXEMPT SOLVENT DATA
REGISTRATION FORM AP-6

Please read and respond to the followign questions:

1. Total actual VOC emissions (excluding the 13 compounds specified below* from this facility in calendar year 1991 ______________tons.

2. Total emissions of the thirteen compounds specified below* from this facility in calendar year 1991______________tons.

3. What is the (max. production) annual potential to emit the items in question 1, above_____________tons/year, as established by Department Plan Approval (s) (permits). Specify applicable Plan Approval Nos. on lines provided below. If you do not have permit(s) for some or all of these materials, explain when the process was installed and/or commenced operation and attach "potential ot emit" on annual basis calculations bearing the signature of the responsible company official. This potential "emission" is your facility's highest annual emission which will never be surpassed.

Plan Approval (permit) No.	Date of Department Letter

(attach additional listing, if applicable)

4. What is the (max. production) annual "potential to emit" the items in question 2, above, ____________tons/year, as established by Department Plan Approval (permit). Specify applicable Plan Approval Nos. opn lines provided below. If you do not have permit(s) for some or all of these materials, explain when the process was installed and/or commenced operation and attach "potential to emit" on an annual basis calculations bearing the signature of the responsible company official.

Plan Approval (permit) No.   Date of Department Letter

(attach additional listing, if applicable)

* Compounds

1. 1,1,1,-trichloroethane (methyl chloroform)
2. trichlorotrifluoroethane
3. dichloromethane (a.k.a methylene chloride)
4. trichlorolfluoromethane (CFC-11)
5. dichlorofluoromethane (CFC-12)
6. chlorodifluoromethane (CFC-22)
7. trifluroemethane (CFC-23)
8. dichlorotetrafluoroethane (CFC-114)
9. chloropentafluorethane (CFC-115)
10. 2,2-dichloro-1,1,1-trifluoroethane (CFC-123)
11. 1,1,2,2-tetrqafluoroethane (CFC-134a)
12. 1,1-dichloro-1-fluroethane (CFC -141b)
13. 1-chloro-1,1-difluoroethane (CFC-142b)

CERTIFICATION: I certify that I have completed the above and to the best of my knowledge it is true and complete.

Signature:____________________ **TITLE:**__________________ **DATE:**__/__/___

Print Name:____________________

1991

INDIVIDUAL POINT SOURCE CATEGORIES

Storage, Transportation And Marketing Of Petroleum Products and Volatile Organic Liquids (VOL)

Oil And Gas Production
  Storage
  Fugitives
  Other Process Units (specify)

Natural Gas And Gasoline Processing
  Storage
  Fugitives
  Other Process Units (specify)

Oil Processing
  Storage
  Fugitives
  Other Process Units (specify)

Tank Farms (specify material stored)
  Fixed Roof Tanks
  External Floating Roof Tanks
    Primary Seals
    Secondary Seals
  Internal Floating Roof Tanks

Bulk Gasoline And VOL Terminals
  Leaks From Valves, Flanges Meters, Pumps
  Vapor Collection Losses
  Vapor Control Unit Losses
  Filling Losses From Uncontrolled Loading Racks
  Tank Truck Vapor Leaks From Loading Of Gasoline
  Non-tank Farm Storage

Gasoline Bulk Plants
  Gasoline Bulk Storage
  Loading And Unloading Racks (Controlled And Uncontrolled)
  Tank Truck Vapor Leaks From Loading And Unloading Of Gasoline
  Leaks From Valves, Flanges, Meters, Pumps

Barge And Tanker Transfer
  Gasoline Loading/Barge
  Crude Oil Ballasting/Tanker

Barge And Tanker Cleaning

Industrial Processes

Petroleum Refineries
  Process Drains And Wastewater Separators
  Vacuum Producing Systems
  Process Unit Turnarounds
  Fugitive Leaks From Seals, Valves, Flanges, Pressure Relief Devices, Drains
  Other Process Emissions Such As Heaters, Boilers, Cat Cracker Regenerators (specify)

Lube Oil Manufacture

Pharmaceutical Manufacture
  Process Units Such As Vacuum Dryers, Reactors, Distillation Units, Filters, Extractors, Centrifuges, Crystallizers
  Major Production Equipment Such As Exhaust Systems And Air Dryers
  Storage And Transfer
  Other Process Units (specify)

Rubber Tire Manufacture
  Undertread And Sidewall Cementing
  Bead Dipping
  Bead Swabbing
  Tire Building
  Tread End Cementing
  Green Tire Spraying
  Tire Curing

Solvent Mixing
  Solvent Storage
  Other Process Units (specify)

Styrene Butadiene Rubber Manufacture
  Blowdown Tanks
  Steam Stripper
  Prestorage Tanks
  Other Process Units (specify)

Vegetable Oil
  Oil Extraction And Desolventization
  Meal Preparation
  Oil Refining
  Fugitive Leaks
  Solvent Storage
  Other Process Units (specify)

Organic Chemical Manufacture (specify major chemicals)
  Fugitive Leaks From Seals, Valves, Flanges, Pressure Relief Devices, Drains
  Air Oxidation Units
  Waste Water Separators
  Storage And Transfer
  Other Process Units (specify)

Polymer And Resin Manufacture
  Catalyst Preparation
  Reactor Vents
  Separation of Reactants, Solvents And Diluents From Product
  Raw Material Storage
  Solvent Storage
  Other Process Units (specify)

Plastic Products Manufacture
  Mold Release
  Solvent Consumption

Adhesives Consumption
  Other Process Units (specify)

Inorganic Chemical Manufacture
  Fugitive Leaks From Seals, Valves, Flanges,
    Pressure Relief Devices, Drains
  Storage And Transfer
  Other Process Units (specify)

Fermentation Processes
  Fermentation Tank Venting
  Aging/Wine or Whiskey
  Other Process Units (specify)

Iron And Steel Manufacture
  Coke Production
    Coke Pushing
    Coke Oven Doors
    Coke Byproduct Plant
    Coke Charging
    Coal Preheater
    Topside Leaks
    Quenching
    Battery Stacks
  Sintering
  Electric Arc Furnaces
  Other Process Units (specify)

Synthetic Fiber Manufacture
  Dope Preparation
  Filtration
  Fiber Extrusion - Solvent Recovery
  Takeup Stretching, Washing, Drying, Crimping, Finishing
  Fiber Storage - Residual Solvent Evaporation
  Equipment Cleanup
  Solvent Storage
  Other Process Units (specify)

- Chemical Manufacturing
  - Adipic Acid
  - Nitric Acid
  - Other

- Mineral Products
  - Cement
  - Glass
  - Other

Industrial Surface Coating

- Large Appliances
  - Cleaning And Pretreatment
  - Prime Spray, Flow, Or Dip Coating Operations
  - Topcoat Spray
  - Coating Mixing
  - Coating And Solvent Storage
  - Equipment Cleanup
  - Other Process Emissions (specify)

- Magnet Wire
  - Cleaning And Pretreatment
  - Coating Application And Curing
  - Coating Mixing
  - Coating And Solvent Storage
  - Equipment Cleanup
  - Other Process Emissions (specify)

- Automobiles And Light Duty Trucks
  - Cleaning And Pretreatment
  - Prime Application, Electrodeposition, Dip Or Spray
  - Prime Surfacing Operations
  - Topcoat Operation
  - Repair Topcoat Application Area
  - Coating Mixing
  - Coating And Solvent Storage
  - Equipment Cleanup
  - Other Process Emissions (specify)

- Cans
  - Cleaning And Pretreatment
  - Two Piece And Exterior Base Coating
  - Interior Spray Coating
  - Sheet Basecoating (Interior)
  - Sheet Basecoating (Exterior)
  - Side Seam Spray Coating
  - End Sealing Compound
  - Lithography
  - Over Varnish
  - Coating Mixing
  - Coating And Solvent Storage
  - Equipment Cleanup
  - Other Process Emissions (specify)

- Paper
  - Coating Operations
  - Coating Mixing
  - Coating And Solvent Storage
  - Equipment Cleanup
  - Other Process Emissions (specify)

- Coil Coating
  - Prime Coating
  - Finish Coating
  - Solvent Mixing
  - Solvent Storage
  - Equipment Cleanup
  - Other Process Emissions (specify)

- Fabric
  - Coating Operations
  - Coating Mixing
  - Coating And Solvent Storage
  - Equipment Cleanup
  - Other Process Emissions (specify)

- Metal And Wood Furniture
  - Cleaning And Pretreatment

- Coating Operations
- Coating Mixing
- Coating And Solvent Mixing
- Equipment Cleanup
- Other Process Emissions (specify)

Flatwood Products
- Filter
- Sealer
- Basecoat
- Topcoat
- Inks
- Coating Mixing
- Coating And Solvent Storage
- Equipment Cleanup
- Other Process Emissions (specify)

Plastic Products
- Cleaning And Pretreatment
- Coating Operations, Flow, Dip, Spray
- Coating Mixing
- Coating And Solvent Storage
- Equipment Cleanup
- Other Process Emissions (specify)

Large Ships
- Cleaning And Pretreatment
- Prime Coat Operation
- Topcoat Operation
- Coating Mixing
- Coating And Solvent Storage
- Equipment Cleanup
- Other Process Emissions (specify)

Large Aircraft
- Cleaning And Pretreatment
- Prime Coat Operation
- Topcoat Operation
- Coating And Solvent Storage

- Equipment Cleanup
- Other Process Emissions (specify)

Miscellaneous Metal Parts And Products
  - Cleaning And Pretreatment
  - Coating Operations, Flow, Dip, Spray
  - Coating Mixing
  - Coating And Solvent Storage
  - Equipment Cleanup
  - Other Process Emissions (specify)

Other Solvent Use

Dry Cleaning
  - Perchloroethylene
  - Petroleum
  - Other

Degreasing
  - Open Top Vapor Degreasing
  - Conveyorized Degreasing - Vapor
  - Conveyorized Degreasing - Cold Cleaning

Solvent Extraction Processes

Adhesives
  - Adhesive Application
  - Solvent Mixing
  - Solvent Storage
  - Other Process Emissions (specify)

Graphic Arts
  - Letter Press
  - Rotogravure
  - Offset Lithography
  - Ink Mixing
  - Solvent Storage

Waste Disposal

Municipal Waste
  - Combustion
    - Refuse Derived Fuel (RDF)
    - Mass Burn
    - Co-fired
    - Other
  - Landfills

Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs)
  - Lagoons
  - Tanks
  - Mixing
  - Aeration
  - Landfills
  - Other

Publicly Owned Treatment Works (POTWs)
  - Tanks
  - Lagoons
  - Aeration
  - Mixing
  - Digestion
  - Other

Industrial Wastewater Treatment
  - Tanks
  - Lagoons
  - Aeration
  - Mixing
  - Digestion
  - Other

Industrial Boilers
  - Co-firing (specify major substances and co-firing fuels, such as oil, gas, coal, etc.)

External Fuel Combustion

- Utility Boilers
- Industrial Boilers
- Commercial/Institutional Boilers
- Other External Fuel Combustion

Stationary Internal Combustion

- Reciprocating Engines
- Gas Turbines

APPENDICES A.4

SAMS SUMMARY PRINTOUTS
BY COUNTY

ALL CATEGORIES
VOC
NOX
CO

APPENDIX

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SAMS    Report Date: 04/16/92                    DETAILED POINT SOURCE LISTING                                               Page 1-1
PLANT INFORMATION

        Plant Name: CHEMDESIGN CORP                                    Type of Inventory: 7   Last Updated by: RAB on 04/11/92
        Total Plant VOC Annual Emissions:          13 tons/yr     Total Plant VOC Ozone Season Daily Emissions:          0 lbs/day
        Total Plant NOX Annual Emissions:           4 tons/yr     Total Plant NOX Ozone Season Daily Emissions:          2 lbs/day
        Total Plant CO  Annual Emissions:           0 tons/yr     Total Plant CO  Ozone Season Daily Emissions:          0 lbs/day
        Total Plant CO CO Season Emissions:           0 lbs/day
        State: Massachusetts        County: Worcester Co                   AQCR: 118
        NEDS Plant ID: 0101       CDS Plant ID: 00101       Local Plant ID: 0090
        Street Address: 99                                       City: DEVELOPMENT ROAD                          Zip Code: 01420-0000
        City Code: 2640        UTM Zone: 19       UTM Easting: 265.3        UTM Northing: 4714.7
        Township/Modeling Grid Code:
        SIC Codes - Primary: 2869        Secondary:                Tertiary:
        Principal Product:                      Employees: 0100        Plant Area:     0.0 acres
        Plant Contact: STEVEN SERIAN           Telephone Number: (508) 345-9999
        Plant Level Comment: CUSTOM CHEMICAL MFG

POINT INFORMATION

        Point ID: 01       Local Point ID: 001  SIC: 2869                              Last Updated by: RAB on 04/11/92
        Total Point VOC Annual Emissions:          13 tons/yr     Total Point VOC Ozone Season Daily Emissions:          0 lbs/day
        Total Point NOX Annual Emissions:           0 tons/yr     Total Point NOX Ozone Season Daily Emissions:          0 lbs/day
        Total Point CO  Annual Emissions:           0 tons/yr     Total Point CO  Ozone Season Daily Emissions:          0 lbs/day
        Total Point CO CO Season Emissions:           0 lbs/day
        UTM Easting: 265.3      UTM Northing: 4714.7       Latitude: 42-33-02       Longitude: 071-51-31
        Operating Schedule - Hours per day: 24       Days per week: 7        Weeks per year: 50
        Start time: 00:00        Ending time: 23:59
        Throughputs - December through February: 25        March through May: 25
                   June through August: 25       September through November: 25
        Stack Parameters - Height: 0067       Diameter:  1.0        Temperature: 0075       Plume Rise:
                       Flowrate:                  Exit Velocity:   0.0       Points with Common Stack: 0101
        AFS Stack: 001       Boiler Capacity:                Space Heat Percentage:  0.0
        Point Level Comment:

POINT EMISSIONS INFORMATION

        Pollutant: VOLATILE ORGANIC COMPOUNDS                                                   Last Updated by: RAB on 04/11/92
        Primary Control Device: NO EQUIPMENT
        Secondary Control Device: NO EQUIPMENT
        Control Device Efficiency:  0.0%
        Measured Emissions:              Units:          Method of Emissions Measurement:
        Estimated Emissions:              Estimation Method: CALCULATED USING FEDERAL EMISSION FACTOR
        Emissions Summed from Process:        tons/year              lbs/day              lbs/day
        SIP Regulation in Place (Y/N)? Y       Compliance Year: 90       Emission Limitation:
        SIP Emission Limitation:               SIP Emission Limitation Units:
        Point Emissions Level Comment:

PROCESS INFORMATION

        SCC Number: 3-01-060-99      SCC Sequence Number: 01                                Last Updated by: RAB on 04/14/92
        SCC Description: Chemical Manufacturing -/Chemical Manufacturing -/Pharmaceutical Preparatio/Other Not Classified
        Type of Source: Process        Percent Sulfur:  0.0        Percent Ash:  0.0        Heat Content:
        Confidentiality: Available for public review
        AFS Segment: 01        Process Rate Units: Hundreds of Pounds of Product
        Actual Annual Process Rate: 0200000        Maximum Design Rate:     0.000
        O3 Season Daily Process Rate: .01          CO Season Daily Process Rate: 0
        Process Level Comment:
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PROCESS EMISSIONS INFORMATION

          Pollutant: VOLATILE ORGANIC COMPOUNDS                                                 Last Updated by: RAB on 04/11/92
          Primary Control Device: ACTIVATED CARBON ADSORPTION
          Secondary Control Device: NO EQUIPMENT
          Control Device Efficiency: 50.0%
          SIP Regulation in Place (Y/N)? N       Compliance Year:          Emission Limitation:
          SIP Emission Limitation:               SIP Emission Limitation Units:
          Estimation Method: MATERIAL BALANCE                                       Emission Factor:
          Annual Nonbanked Emissions: 0000013 tons per year     Annual Banked Emissions:         tons per year
          Seasonal Adjustment Factor:            Rule Effectiveness: 080
          03 Season Daily Emissions: 0       lbs       CO Season Daily Emissions:          lbs
          Process Emissions Level Comment: 0

POINT INFORMATION

          Point ID: 02       Local Point ID: 002  SIC: 2869                         Last Updated by: RAB on 04/11/92
          Total Point VOC Annual Emissions:          0 tons/yr     Total Point VOC Ozone Season Daily Emissions:          0 lbs/day
          Total Point NOX Annual Emissions:          2 tons/yr     Total Point NOX Ozone Season Daily Emissions:          1 lbs/day
          Total Point CO  Annual Emissions:          0 tons/yr     Total Point CO  Ozone Season Daily Emissions:          0 lbs/day
          Total Point CO CO Season Emissions:          0 lbs/day
          UTM Easting: 265.3      UTM Northing: 4714.7       Latitude: 42-33-02       Longitude: 071-51-31
          Operating Schedule - Hours per day: 24       Days per week: 7       Weeks per year: 50
          Start time: 00:00       Ending time: 23:59
          Throughputs - December through February: 25       March through May: 25
                        June through August: 25       September through November: 25
          Stack Parameters - Height: 0050       Diameter:  1.8       Temperature: 0450       Plume Rise:
                             Flowrate:                   Exit Velocity:    0.0       Points with Common Stack: 0203
          AFS Stack: 002       Boiler Capacity:               Space Heat Percentage:  0.0
          Point Level Comment: KEWANEE BOILER

POINT EMISSIONS INFORMATION

          Pollutant: NITROGENOUS COMPOUNDS (NOx)                                                Last Updated by: RAB on 04/11/92
          Primary Control Device: NO EQUIPMENT
          Secondary Control Device: NO EQUIPMENT
          Control Device Efficiency:  0.0%
          Measured Emissions:                Units:          Method of Emissions Measurement:
          Estimated Emissions:                 Estimation Method: CALCULATED USING FEDERAL EMISSION FACTOR
          Emissions Summed from Process:         tons/year            lbs/day             lbs/day
          SIP Regulation in Place (Y/N)? Y       Compliance Year: 90       Emission Limitation:
          SIP Emission Limitation:               SIP Emission Limitation Units:
          Point Emissions Level Comment:

PROCESS INFORMATION

          SCC Number: 1-02-006-02       SCC Sequence Number: 01                     Last Updated by: RAB on 04/14/92
          SCC Description: External Combustion Boile/External Combustion Boile/Natural Gas/10-100 MMBtu/Hr
          Type of Source: Process       Percent Sulfur:  0.0       Percent Ash:  0.0       Heat Content:
          Confidentiality: Available for public review
          AFS Segment: 01       Process Rate Units: Million Cubic Feet Burned
          Actual Annual Process Rate: 0000022       Maximum Design Rate:     0.000
          03 Season Daily Process Rate: 0.01       CO Season Daily Process Rate: 0
          Process Level Comment:
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PROCESS EMISSIONS INFORMATION

        Pollutant: NITROGENOUS COMPOUNDS (NOx)                                           Last Updated by: RAB on 04/11/92
        Primary Control Device: NO EQUIPMENT
        Secondary Control Device: NO EQUIPMENT
        Control Device Efficiency:  0.0%
        SIP Regulation in Place (Y/N)? N       Compliance Year:         Emission Limitation:
        SIP Emission Limitation:               SIP Emission Limitation Units:
        Estimation Method: CALCULATED USING FEDERAL EMISSION FACTOR            Emission Factor: 140.0
        Annual Nonbanked Emissions:      2 tons per year       Annual Banked Emissions:          tons per year
        Seasonal Adjustment Factor:            Rule Effectiveness: N/A
        O3 Season Daily Emissions:       1 lbs       CO Season Daily Emissions:        lbs
        Process Emissions Level Comment:

POINT INFORMATION

        Point ID: 03      Local Point ID: 003  SIC: 2869                    Last Updated by: RAB on 04/11/92
        Total Point VOC Annual Emissions:           0 tons/yr     Total Point VOC Ozone Season Daily Emissions:        0 lbs/day
        Total Point NOX Annual Emissions:           2 tons/yr     Total Point NOX Ozone Season Daily Emissions:        1 lbs/day
        Total Point CO  Annual Emissions:           0 tons/yr     Total Point CO  Ozone Season Daily Emissions:        0 lbs/day
        Total Point CO CO Season Emissions:          0 lbs/day
        UTM Easting: 265.3       UTM Northing: 4714.7       Latitude: 42-33-02       Longitude: 071-51-31
        Operating Schedule - Hours per day: 24       Days per week: 7       Weeks per year: 50
        Start time: 00:00       Ending time: 23:59
        Throughputs - December through February: 25       March through May: 25
                   June through August: 25       September through November: 25
        Stack Parameters - Height: 0050       Diameter:  1.8       Temperature: 0450       Plume Rise:
                         Flowrate:                  Exit Velocity:   0.0       Points with Common Stack: 0203
        AFS Stack: 002       Boiler Capacity:               Space Heat Percentage:  0.0
        Point Level Comment:

POINT EMISSIONS INFORMATION

        Pollutant: NITROGENOUS COMPOUNDS (NOx)                                           Last Updated by: RAB on 04/11/92
        Primary Control Device: NO EQUIPMENT
        Secondary Control Device: NO EQUIPMENT
        Control Device Efficiency:  0.0%
        Measured Emissions:                 Units:         Method of Emissions Measurement:
        Estimated Emissions:                 Estimation Method: CALCULATED USING FEDERAL EMISSION FACTOR
        Emissions Summed from Process:          tons/year            lbs/day            lbs/day
        SIP Regulation in Place (Y/N)? Y        Compliance Year: 90       Emission Limitation:
        SIP Emission Limitation:                SIP Emission Limitation Units:
        Point Emissions Level Comment:

PROCESS INFORMATION

        SCC Number: 1-02-006-02       SCC Sequence Number: 01                   Last Updated by: RAB on 04/11/92
        SCC Description: External Combustion Boile/External Combustion Boile/Natural Gas/10-100 MMBtu/Hr
        Type of Source: Boiler        Percent Sulfur:  0.0        Percent Ash:  0.0       Heat Content:
        Confidentiality: Available for public review
        AFS Segment: 01        Process Rate Units: Million Cubic Feet Burned
        Actual Annual Process Rate: 0000022        Maximum Design Rate:     0.000
        O3 Season Daily Process Rate: 0.01          CO Season Daily Process Rate: 0
        Process Level Comment:
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APPENDIX

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PROCESS EMISSIONS INFORMATION

        Pollutant: NITROGENOUS COMPOUNDS (NOx)                                                  Last Updated by: RAB on 04/11/92
        Primary Control Device: NO EQUIPMENT
        Secondary Control Device: NO EQUIPMENT
        Control Device Efficiency:  0.0%
        SIP Regulation in Place (Y/N)? N      Compliance Year:          Emission Limitation:
        SIP Emission Limitation:              SIP Emission Limitation Units:
        Estimation Method: CALCULATED USING FEDERAL EMISSION FACTOR                Emission Factor: 140.0
        Annual Nonbanked Emissions:       2 tons per year       Annual Banked Emissions:            tons per year
        Seasonal Adjustment Factor:           Rule Effectiveness: N/A
        O3 Season Daily Emissions:       1 lbs       CO Season Daily Emissions:          lbs
        Process Emissions Level Comment:
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APPENDICES B
STATIONARY AREA SOURCES

LANDFILLS AND WASTE MGT.

B.1-1 IWW INTO POTW'S
B.1-2 MSW LANDFILLS LISTING
B.1-3 LANDFILL NMOC EM.CALCULATIONS
B.1-4 LANDFILL NMOC EM. SORTED BY COUN

FEB 2 [illegible]

APPENDIX

APPENDIX B TABLE B.1-1

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INDUSTRIAL WASTEWATER FLOW INTO POTW'S
alpha sorted by POTW facility and SIC

file: Siwwsic

REG	REC	FACILITY NAME	REC.WATER	FLOW G/DY	FLOW MG/DY	FLOW MG/YR	PRE TRE	SICC	STA TUS	SITE CITY	SIMS INDUSTRIES
SE	16	JOSTENS INC	-	6500	0.0065	2.37	Y	3911	ISS	-	ELECTROPL & METAL FIN
SE	1	ABINGTON LAUND	ABINGTON	7600	0.0076	2.77	N	7211	ISS	ABINGTON	IND & COM LAUNDRY
SE	2	ACUSHNET CO	ACUSHNET	150000	0.1500	54.75	Y	3949	ISS	ACUSHNET	ELECTROPL & METAL FIN
WES	1	POWER SHIELD TECH	ADAMS	480	0.0005	0.18	N	-	ISS	ADAMS	
WES	65	SPRAGUE ELEC	ADAMS	1000	0.0010	0.37	N	3675	ISS	N ADAMS	EL & ELTRONIC COMP
WES	81	WESTMASS AREA	AGAWAM	125000	0.1250	45.63	Y	-	ISS	AGAWAM	
WES	4	AGAWAM DPW	AGAWAM	101500	0.1015	37.05	Y	-	ISS	AGAWAM	
WES	80	W MASS LUB	AGAWAM	75	0.0001	0.03	N	-	ISS	AGAWAM	
WES	3	TOWN AGAWAM DPW	AGAWAM	348000	0.3480	127.02	Y	-	ISS	AGAWAM	
					0.5746	209.72					
SE	118	SPRINGBORN LIFE	AGAWAM RIVER	38000	0.0380	13.87	N	8734	ISS	WAREHAM	-
NE	2	TECH	AMESBURY	1050	0.0011	0.38	Y	3679	ISS	AMESBURY	EL & ELTRONIC COMP
NE	187	CRAIG SYS	AMESBURY	5000	0.0050	1.83	-	3662	ISS	AMESBURY	EL & ELTRONIC COMP
NE	7	MICROFAB INC	AMESBURY	100000	0.1000	36.50	Y	3679	ISS	AMESBURY	EL & ELTRONIC COMP
NE	3	EASTERN MANUF	AMESBURY	38000	0.0380	13.87	Y	3672	ISS	AMESBURY	EL & ELTRONIC COMP
NE	5	EASTERN MANUF	AMESBURY	38000	0.0380	13.87	Y	3471	ISS	AMESBURY	ELECTRO & MET FIN
NE	6	EASTERN MANUF	AMESBURY	40000	0.0400	14.60	Y	3471	ISS	AMESBURY	ELECTRO & MET FIN
NE	4	CRAIG SYSTEMS	AMESBURY	5000	0.0050	1.83	Y	3471	ISS	AMESBURY	ELECTRO & MET FIN
NE	191	JOHN KEFALIS	AMESBURY POT	3562	0.0036	1.30	N	-	PEN	LEXINGTON	
NE	9	BRAZONICS M/A	AMESBURY POT	0	0.0000	0.00	-	-	-	AMESBURY	
NE	8	M/A ADAMS RUSS	AMESBURY POT	0	0.0000	0.00	-	-	-	AMESBURY	
NE	1	EMC #1	AMESBURY POT	16300	0.0163	5.95	Y	3471	PEND	AMESBURY	ELECTRO & MET FIN
					0.2469	90.12					
CEN	2	BOARD OF PUBLIC WK	ATHOL	34000	0.0340	12.41	N	-	ISS	ATHOL	
CEN	1	DUALL PLASTICS	ATHOL	5000	0.0050	1.83	Y	3082	ISS	ATHOL	PLASTIC MOLD
					0.0390	14.24					
SE	12	FOSTER INC.	ATLEBORO	1025	0.0010	0.37	Y	3961	ISS	ATTLEBORO	ELECTROPL & METAL FIN
SE	24	AERO TECH	ATTLEBORO	30000	0.0300	10.95	-	-	ISS	ATTLEBORO	
SE	6	ADVANCE INDUS	ATTLEBORO	250	0.0003	0.09	Y	-	ISS	ATTLEBORO	
SE	13	DPW OF ATTLEBORO	ATTLEBORO	21350	0.0214	7.79	N	-	ISS	ATTLEBORO	
SE	15	TAXAS INSTR	ATTLEBORO	25000	0.0250	9.13	N	3613	ISS	ATTLEBORO	EL & ELTRONIC COMP
SE	25	AUGAT INC.	ATTLEBORO	72000	0.0720	26.28	-	3678	ISS	ATTLEBORO	EL & ELTRONIC COMP
SE	20	KILMARTIN INDU	ATTLEBORO	15000	0.0150	5.48	Y	3469	ISS	ATTLEBORO	ELECTRO & MET FIN
SE	18	QUAL-CRAFT	ATTLEBORO	28000	0.0280	10.22	Y	3471	ISS	ATTLEBORO	ELECTRO & MET FIN
SE	8	SWANK INC	ATTLEBORO	75000	0.0750	27.38	Y	3961	ISS	ATTLEBORO	ELECTROPL & METAL FIN
SE	7	LAMBERT ANDDIZING	ATTLEBORO	3000	0.0030	1.10	Y	3961	ISS	ATTLEBORO	ELECTROPL & METAL FIN
SE	21	PLASTIC CRAFT	ATTLEBORO	400	0.0004	0.15	Y	3961	ISS	ATTLEBORO	ELECTROPL & METAL FIN
SE	14	LG BALFOUR	ATTLEBORO	3240	0.0032	1.18	Y	3911	ISS	ATTLEBORO	ELECTROPL & METAL FIN
SE	9	LG BALFOUR	ATTLEBORO	23000	0.0230	8.40	Y	3911	ISS	ATTLEBORO	ELECTROPL & METAL FIN
SE	17	KREW INC	ATTLEBORO	8000	0.0080	2.92	Y	3911	ISS	ATTLEBORO	ELECTROPL & METAL FIN
SE	4	COMPOSITE TECH	ATTLEBORO	12000	0.0120	4.38	Y	3521	PEN	ATTLEBORO	EQPT MFG & ASSEMB
SE	11	LEACH &GARNER	ATTLEBORO	34000	0.0340	12.41	Y	3356	ISS	ATTLEBORO	NONFERROUS MET FORM
SE	10	HANDY&HARMAN	ATTLEBORO	30000	0.0300	10.95	Y	3341	ISS	ATTLEBORO	NONFERROUS MET MFG
SE	23	TEKNOR APEX	ATTLEBORO	80000	0.0800	29.20	-	2869	ISS	ATTLEBORO	ORG CHEM MFG
SE	5	PRECISION METAL	ATTLEBORO PO	2000	0.0020	0.73	Y	3679	PEN	ATTLEBORO	EL & ELTRONIC COMP
SE	22	HOWARD H SWEET	ATTLEBORO WA	8000	0.0080	2.92	Y	3471	ISS	ATTLEBORO	ELECTRO & MET FIN
SE	19	RF SIMMONS	ATTLEBORO WW	8000	0.0080	2.92	Y	3961	ISS	ATTLEBORO	ELECTROPL & METAL FIN
					0.4793	174.93					
NE	237	N.E SHRIMP	AYER WWTF	242000	0.2420	88.33	Y	2030	ISS	AYER	-
CEN	4	CUSTOM ELECTRO	AYER WWTF	2000	0.0020	0.73	Y	3471	ISS	AYER	ELECTRO & MET FIN

APPENDIX

CEN	5	THE HORN CORP	AYER WWTF	100	0.0001	0.04	N	2441	ISS	AYER	TIMBER PROD
					0.2441	89.10					
CEN	77	AFTER MARKET	BARNSTABLE	0	0.0000	0.00	Y	-	SEW	BARNSTABLE	
SE	69	AFTER MARKET SER	BARNSTABLE	5	0.0000	0.00	Y	-	ISS	BARNSTABLE	
SE	31	ACME LAUNDRY	BARNSTABLE W	35000	0.0350	12.78	Y	7211	ISS	CHATHAM	IND & COM LAUNDRY
CEN	75	ACME LAUNDRY	BARNSTABLE W	35000	0.0350	12.78	Y	7211	ISS	BARNSTABLE	IND & COM LAUNDRY
CEN	76	THE LAUND R	BARNSTABLE W	5000	0.0050	1.83	Y	7213	ISS	BARNSTABLE	IND & COM LAUNDRY
SE	70	THE LAUNDRY ROOM	BARNSTABLE W	5000	0.0050	1.83	N	7213	ISS	BARNSTABLE	IND & COM LAUNDRY
NE	217	BASBANES LIN	BARNSTABLE W	1658	0.0017	0.61	-	-	ISS	BARNSTABLE	
SE	68	CHASE LAUNDRY	BARNSTABLE	240	0.0002	0.09	N	-	ISS	BARNSTABLE	
CEN	78	CHASE LAUNDRY	BARNSTABLE	240	0.0002	0.09	Y	-	ISS	BARNSTABLE	
					0.0821	29.98					
WES	8	ANGELO SALVADORE	BARRE POTW	3578	0.0036	1.31	N	-	PEN	BARRE	
CEN	7	R J DUVAL &SON	BARRE WWTF	9600	0.0096	3.50	N	7542	ISS	BARRE	-
					0.0132	4.81					
NE	39	BNZ MATERIAL	BILLERICA	36750	0.0368	13.41	Y	3296	ISS	BILLERICA	MINERAL WOOL
NE	303	MOBIL TYCO SOL	BILLERICA LE	9000	0.0090	3.29	-	3999	ISS	BILLERICA	ELECTROPL & METAL FIN
NE	36	OTIS ELEVATOR	BILLERICA PO	1500	0.0015	0.55	Y	-	PEN	BILLERICA	
NE	37	ROY BROS	BILLERICA PO	7000	0.0070	2.56	Y	4213	PEN	BILLERICA	-
NE	43	NUTCRACKER SNACK	BILLERICA PO	1300	0.0013	0.47	Y	2065	ISS	BILLERICA	-
NE	41	HYBIRD SYS CORP	BILLERICA WW	500	0.0005	0.18	-	-	ISS	BILLERICA	
					0.0561	20.46					
WES	90	OFREST PK LAU	BONDI IS	8000	0.0080	2.92	N	7215	ISS	SPRINGFIELD	IND & COM LAUNDRY
WES	93	PUNDERSON OIL	BONDI IS	50	0.0001	0.02	N	-	ISS	SPRINGFIELD	PETROLEUM
WES	59	RAUL FRAGA	BONDI IS WW	400	0.0004	0.15	Y	-	ISS	LUDLOW	
WES	68	SHELL OIL	BONDI IS WW	50	0.0001	0.02	N	7542	ISS	SPRINGFIELD	PETROLEUM
CEN	94	MR SPARKLE CAR	BONDI IS WWP	3000	0.0030	1.10	Y	7542	ISS	-	-
CEN	50	MR SPARKLE CAR	BONDI IS WWT	3000	0.0030	1.10	N	7542	ISS	SOUTH WINSOR	-
WES	124	JAMES FIORE	BONDI IS WWT	8800	0.0088	3.21	N	7215	ISS	WILBRAHAM	IND & COM LAUNDRY
WES	40	TYLER EQUIP	BONDI ISL	1000	0.0010	0.37	N	1794	ISS	E LONGMEADOW	-
WES	102	SMITH&WESSON	BONDI ISL	75000	0.0750	27.38	Y	3484	ISS	SPRINGFIELD	ELECTRO & MET FIN
WES	61	AAR CIRCAMET	BONDI ISL	170	0.0002	0.06	Y	3724	ISS	LUDLOW	EQPT MFG & ASSEMB
WES	94	DANIEL DRESS	BONDI ISL SR	16	0.0000	0.01	N	8011	ISS	SPRINGFIELD	-
WES	101	SYS REAL EST	BONDI ISL SR	8	0.0000	0.00	Y	8071	ISS	SPRINGFIELD	-
WES	100	N ENG ORTH	BONDI ISL SR	768	0.0008	0.28	Y	8621	ISS	SPRINGFIELD	-
WES	98	FL ROBERT& CO	BONDI ISL SR	8400	0.0084	3.07	N	7215	ISS	SPRINGFIELD	IND & COM LAUNDRY
WES	97	GA COM	BONDI ISL SR	1	0.0000	0.00	Y	7395	ISS	SPRINGFIELD	PHOTOGRAPHIC
WES	95	DAVID STANSB	BONDI ISL SR	1	0.0000	0.00	N	7395	ISS	SPRINGFIELD	PHOTOGRAPHIC
WES	96	COM-COLOR	BONDI ISL SR	10	0.0000	0.00	N	7395	ISS	SPRINGFIELD	PHOTOGRAPHIC
WES	91	ADVAN LABS	BONDI ISL SR	150	0.0002	0.05	N	2751	ISS	SPRINGFIELD	PRINT & PUBL
WES	125	FRIENDLY ICEC	BONDI ISL ST	75000	0.0750	27.38	Y	5812	ISS	WILBRAHAM	-
WES	60	JOHN&MANUEL SIL	BONDI ISL TR	12000	0.0120	4.38	Y	7399	ISS	LUDLOW	-
WES	115	HAYMARKET	BONDI ISL WW	1470	0.0015	0.54	Y	-	ISS	SPRINGFIELD	
WES	73	ALI R KAVLAK	BONDIS ISL W	3900	0.0039	1.42	N	-	ISS	W SPRINGFIELD	
CEN	96	370 SHOEMK LNE	BONDIS ISL W	480	0.0005	0.18	Y	-	ISS	-	
WES	88	W NEW ENG COLL	BONDIS ISL W	150	0.0002	0.05	N	7539	ISS	SPRINGFIELD	-
WES	87	BAYSTATE MED	BONDIS ISL W	17600	0.0176	6.42	Y	8062	ISS	SPRINGFIELD	-
WES	89	FL ROBERT& CO	BONDIS ISL W	4000	0.0040	1.46	N	7215	ISS	SPRINGFIELD	IND & COM LAUNDRY
WES	62	CIT YSTAMP WKS	BONDI'S ISL	49	0.0000	0.02	N	3544	ISS	LUDLOW	EQPT MFG & ASSEMB
					0.2235	81.57					
SE	28	MUPAC CORP	BROCKTON	7200	0.0072	2.63	Y	3679	ISS	BROCKTON	EL & ELTRONIC COMP
SE	29	MUPAC CORP	BROCKTON	12000	0.0120	4.38	Y	3679	ISS	BROCKTON	EL & ELTRONIC COMP
SE	121	WHITMAN CO	BROCKTON WW	36000	0.0360	13.14	Y	3471	ISS	WHITMAN	ELECTRO & MET FIN
					0.0552	20.15					
NE	20	CIBA-GEIGY CO	CHARLES RIVE	10844	0.0108	3.96	N	3559	ISS	MEDWAY	EQPT MFG & ASSEMB
CEN	84	MARGUERITE BLD	CHARLES RIVE	120	0.0001	0.04	Y	-	ISS	FRANKLIN	
CEN	83	MARC WINTERS	CHARLES RIVE	3470	0.0035	1.27	Y	7542	ISS	FRANKLIN	-
NE	38	CR BARD	CHARLES RIVE	220	0.0002	0.08	N	3841	ISS	FRANKLIN	EQPT MFG & ASSEMB
SE	64	J&J CORR BOX	CHARLES RIVE	30000	0.0300	10.95	Y	2653	ISS	FRANKLIN	PULP & PAPER
SE	62	MARGUERITE	CHARLES RIVE	120	0.0001	0.04	N	-	ISS	FRANKLIN	

SE	63	MARC WINTERS	CHARLES RIVE	3470	0.0035	1.27	N	7542	ISS	FRANKLIN	-
					0.0482	17.61					
WES	27	CONN VALLEY SN WAS	CHICOPEE	45000	0.0450	16.43	N	-	ISS	CHICOPEE	
WES	21	THE AMES PLAT	CHICOPEE	120000	0.1200	43.80	Y	3471	ISS	CHICOPEE	ELECTRO & MET FIN
WES	30	BAY STATE WIRE	CHICOPEE	2100	0.0021	0.77	Y	3315	ISS	CHICOPEE	IRON & STEEL
WES	31	MCKINSTRY METAL	CHICOPEE	2100	0.0021	0.77	-	3444	ISS	CHICOPEE	IRON & STEEL MFG
WES	15	COMNWLTH PACK	CHICOPEE	50	0.0001	0.02	Y	2751	ISS	CHICOPEE	PRINT & PUBL
WES	18	LEELYN CORP	CHICOPEE	50	0.0001	0.02	N	2751	ISS	CHICOPEE	PRINT & PUBL
WES	22	WALDORF	CHICOPEE	7500	0.0075	2.74	N	2651	ISS	CHICOPEE	PULP & PAPER
WES	28	MASS TANK DISP	CHICOPEE	2000	0.0020	0.73	Y	1795	ISS	CHICOPEE	-
WES	14	DENNISON STATIONARY	CHICOPEE PO	14000	0.0140	5.11	N	2649	ISS	CHICOPEE	PULP & PAPER
WES	12	WESTOVER AFB	CHICOPEE POT	40000	0.0400	14.60	Y	4582	ISS	CHICOPEE	-
WES	33	LEONISCHE AMER	CHICOPEE POT	0	0.0000	0.00	-	3471	PEN	CHICOPEE	ELECTRO & MET FIN
WES	32	LEONISCHE AMER	CHICOPEE POT	4200	0.0042	1.53	Y	3471	ISS	CHICOPEE	ELECTRO & MET FIN
WES	11	HERCULES INC.	CHICOPEE POT	300000	0.3000	109.50	Y	2821	ISS	CHICOPEE	PLASTIC RES & SYNT
NE	248	SUNDER BRANDS	CHICOPEE WA	299000	0.2990	109.14	Y	2086	ISS	CHICOPEE	-
WES	16	SPALDING	CHICOPEE WAT	1563800	1.5638	570.79	N	3949	ISS	CHICOPEE	ELECTROPL & METAL FIN
WES	19	FACEMATE CORP	CHICOPEE WAT	648000	0.6480	236.52	Y	2228	ISS	CHICOPEE	TEXTILE MILLS
WES	23	SPALDING	CHICOPEE WAT	1485000	1.4850	542.03	N	3949	ISS	CHICOPEE	ELECTROPL & METAL FIN
WES	20	JOHN R LYMAN COMP	CHICOPEE WAT	137000	0.1370	50.01	Y	7218	ISS	CHICOPEE	IND & COM LAUNDRY
CEN	90	SUNDOR BRANDS	CHICOPEE WPC	299000	0.2990	109.14	Y	2086	ISS	CHICOPEE WPC	-
WES	24	MASS TANK DIS	CHICOPEE WPC	50000	0.0500	18.25	Y	1795	ISS	CHICOPEE	-
WES	29	MUTI-LAM	CHICOPEE WTP	76500	0.0765	27.92	Y	3479	ISS	CHICOPEE	ELECTRO & MET FIN
WES	17	ONE STOP COIN OP	CHICOPEE WWT	7600	0.0076	2.77	N	-	ISS	CHICOPEE	
WES	26	MOLD-TECH	CHICOPEE WWT	20	0.0000	0.01	Y	3479	ISS	CHICOPEE	ELECTRO & MET FIN
WES	25	ALA-VAL INDUS	CHICOPEE WWT	23000	0.0230	8.40	Y	2298	ISS	CHICOPEE	TEXTILE MILLS
					5.1259	1871.0					
CEN	10	DELTA SUPRE WIRE	CLINTON	0	0.0000	0.00	-	3357	ISS	CLINTON	NONFERROUS MET FORM
CEN	9	LFE CORP	CLINTON SEW	10000	0.0100	3.65	-	3499	ISS	CLINTON	ELECTRO & MET FIN
					0.0100	3.65					
SE	32	SOUTH SHORE ART	COHASSET WWT	20	0.0000	0.01	Y	8299	ISS	COHASSET	-
NE	134	GENRAD INC	CONCORD	10000	0.0100	3.65	-	3829	ISS	CONCORD	EQPT MFG & ASSEMB
SE	33	BOARD OF PUBLIC	DARTMOUTH PO	4000	0.0040	1.46	N	-	PEN	DARTMOUTH	
					0.0140	0.00					
NE	319	ICI RESTING US	DEER IS WWTP	120000	0.1200	43.80	Y	2821	ISS	WILMINGTON	PLASTIC RES & SYNT
NE	299	RIVIERA REALTY TRUST	DEER ISL	0	0.0000	0.00	N	5511	ISS	WALTHAM	-
NE	77	VANASSE HANGEN	DEER ISL	675	0.0007	0.25	N	73	ISS	BOSTON	-
NE	130	EDWARD H DOHERTY	DEER ISL	8000	0.0080	2.92	Y	-	ISS	CHELSEA	
NE	128	VERILITE JEW	DEER ISL TRM	3150	0.0032	1.15	Y	-	ISS	CHELSEA	
NE	129	TOWN&COUNTY	DEER ISL TRM	3150	0.0032	1.15	Y	-	ISS	CHELSEA	
NE	334	ROBERT KEARIN	DEER ISL WWT	17500	0.0175	6.39	N	3079	ISS	WOBURN	PLASTIC MOLD
NE	26	B&F MIRODISK	DEER ISLAND	8207	0.0082	3.00	N	3695	ISS	BEDFORD	EL & ELTRONIC COMP
NE	50	HOSP LAUNDRY	DEER ISLAND	92000	0.0920	33.58	N	7219	ISS	BOSTON	-
NE	25	HEXALON REAL ES	DEER ISLAND	11500	0.0115	4.20	N	6025	ISS	BOSTON	-
					0.2642	96.43					
WES	36	JOHN JANKOWSKI	DEERFIELD	3000	0.0030	1.10	N	7215	ISS	DEERFIELD	IND & COM LAUNDRY
NE	292	CGM CONSTR	DUCK ISL	14000	0.0140	5.11	N	-	ISS	-	
NE	219	COMMANDORE FOOD	DUCK ISL	150000	0.1500	54.75	-	-	ISS	LOWELL	
NE	148	UNITED CIRCUIT	DUCK ISL TRT	9500	0.0095	3.47	Y	3679	ISS	DRACUT	EL & ELTRONIC COMP
NE	124	HERB KASER	DUCK ISL WWF	12800	0.0128	4.67	N	7215	ISS	LOWELL	IND & COM LAUNDRY
NE	195	BARBARA O'MALLEY	DUCK ISL WWT	4800	0.0048	1.75	N	-	ISS	LOWELL	
NE	210	WILLIAM TONNER	DUCK ISL WWT	19000	0.0190	6.94	Y	-	ISS	LOWELL	
NE	120	STICKNEY POOR	DUCK ISL WWT	1500	0.0015	0.55	Y	-	ISS	CHELMSFORD	
NE	196	JEAN RICE	DUCK ISL WWT	4233	0.0042	1.55	N	-	ISS	LOWELL	
NE	213	ARMEN G KLUDJIAN	DUCK ISL WWT	14400	0.0144	5.26	N	7215	ISS	LOWELL	IND & COM LAUNDRY
					0.2302	84.04					
SE	108	PAR BUILDERS	ENVIROTECH O	18000	0.0180	6.57	Y	-	ISS	TAUNTON	
SE	80	FREDDERICK T IDD	FAIRHAVEN TR	3611	0.0036	1.32	N	7542	ISS	MARION	-

SE	109	BRISTOL MNGMNT	FAIRHAVEN WW	3907	0.0039	1.43	Y	7542	ISS	FAIRHAVEN	-
SE	40	FIRST BRISTOL CORP	FAIRHAVEN WW	10000	0.0100	3.65	N	7215	ISS	FAIRHAVEN	IND & COM LAUNDRY
					0.0175	6.39					
SE	45	N E ELECTRO	FALL RIVER	1000	0.0010	0.37	Y	3471	ISS	FALL RIVER	ELECTRO & MET FIN
SE	50	N. AMERICA RUB	F RIVER POTW	28000	0.0280	10.22	Y	-	PEN	FALL RIVER	RUBBER & PLAST
SE	51	FALL RIVER KINDEY	FALL RIVER P	3500	0.0035	1.28	N	-	PEN	FALL RIVER	
SE	52	DOVER PARKERSBURG	FALL RIVER P	7800	0.0078	2.85	N	-	PEN	FALL RIVER	
SE	48	BIO MEDICAL APPLIC	FALL RIVER P	1987	0.0020	0.73	N	8092	ISS	FALL RIVER	-
SE	53	ROMA COLOR	FALL RIVER P	0	0.0000	0.00	-	2865	PEN	FALL RIVER	DYE MFG & FOAM
SE	37	TILLOTSON CO	FALL RIVER P	81400	0.0814	29.71	Y	3069	ISS	FALL RIVER	PLASTIC MOLD
SE	38	GLOBE MANUF	FALL RIVER P	156585	0.1566	57.15	Y	3069	ISS	FALL RIVER	PLASTIC MOLD
SE	39	SWAN FINISHING CO	FALL RIVER P	699276	0.6993	255.24	Y	2228	ISS	FALL RIVER	TEXTILE MILLS
SE	56	PIONEER FINISH	FALL RIVER P	0	0.0000	0.00	-	2269	PEN	FALL RIVER	TEXTILE MILLS
SE	54	DURO TEXT	FALL RIVER P	0	0.0000	0.00	Y	-	PEN	F.RIVER	TEXTILES
SE	55	DURO FINISH	FALL RIVER P	0	0.0000	0.00	-	-	PEN	FALL RIVER	TEXTILES
SE	42	BRISTOL FINISH	FALL RIVER S	59000	0.0590	21.54	Y	2261	ISS	FALL RIVER	TEXTILE MILLS
SE	46	ELBE PROD	FALL RIVER W	5040	0.0050	1.84	Y	2782	ISS	FALL RIVER	PRINT & PUBL
SE	49	MANUF REALTY	FALL RIVER W	200000	0.2000	73.00	-	6512	ISS	FALL RIVER	-
SE	44	HOSP PROD GRP	FALL RIVER W	5700	0.0057	2.08	Y	3841	ISS	FALL RIVER	EQPT MFG & ASSEMB
SE	43	FIRST BRISTOL CO	FALL RIVER W	10000	0.0100	3.65	N	7215	ISS	FALL RIVER	IND & COM LAUNDRY
SE	41	QUAKER FABRIC	FALL RIVER W	2400	0.0024	0.88	Y	2221	ISS	FALL RIVER	TEXTILE MILLS
					1.2617	460.52					
SE	57	L.RONALD CAP	FALMMOUTH PO	9000	0.0090	3.29	N	7215	PEN	FALMOUTH	IND & COM LAUNDRY
SE	58	HOLIDAY INN OF FAL	FALMMOUTH WW	1200	0.0012	0.44	Y	7011	ISS	FALMOUTH	-
CEN	82	FAL SELF SER	FALMOUTH WWP	16800	0.0168	6.13	Y	7215	ISS	FALMMOUTH	IND & COM LAUNDRY
SE	59	FALM SELF SER L	FALMOUTH WWT	16800	0.0168	6.13	Y	7215	ISS	FALMOUTH	IND & COM LAUNDRY
SE	117	HOLIDAY BUSNS ASSOC	FALMOUTH WWT	20000	0.0200	7.30	Y	7215	ISS	FALMOUTH	IND & COM LAUNDRY
					0.0638	23.29					
CEN	13	MART BUS GAR	FITCHBERG WW	28800	0.0288	10.51	Y	-	ISS	FITCHBURG	
CEN	61	ADVANCE COATING	FITCHBURG	15500	0.0155	5.66	Y	2821	ISS	WESTMINSTER	PLASTIC RES & SYNT
NE	21	RAYMOND HACHEY	FITCHBURG E	15650	0.0157	5.71	N	-	PEN	ASHBURNHAM	
CEN	60	JACKSON AVE RE	FITCHBURG PO	3500	0.0035	1.28	N	-	PEN	WESTMINSTER	
CEN	12	CHEMDESIGN CORP	FITCHBURG WE	45000	0.0450	16.43	Y	2869	ISS	FITCHBURG	ORG CHEM MFG
CEN	62	DIGITAL EQUIP	FITCHBURG WW	82	0.0001	0.03	N	7372	ISS	WESTMINSTER	-
					0.1085	39.61					
NE	156	GOOD HARBOR FIL	G RILEY TRT	5000	0.0050	1.83	Y	-	ISS	GLOUCESTER	
NE	55	WAKEFIELD PLCE	GARDNER WWF	400	0.0004	0.15	Y	8811	ISS	BOSTON	-
CEN	72	WAKEFIELD PLACE ASO	GARDNER WWTP	400	0.0004	0.15	Y	8811	ISS	GRAFTON	-
					0.0058	2.12					
NE	157	CONNOLLY WRI	GLOUCESTER	56400	0.0564	20.59	Y	5146	ISS	GLOUCESTER	-
CEN	71	VALLEY PLAZA COIN	GRAFTON WWTP	4000	0.0040	1.46	N	-	ISS	GRAFTON	
CEN	40	WYMAN-GORDON	GRAFTON WWTP	14150	0.0142	5.16	Y	3341	ISS	MILBURY	NONFERROUS MET MFG
					0.0182	6.62					
WES	44	COCA-COLA BOTT	GREENFIELD	14000	0.0140	5.11	Y	2086	ISS	GREENFIELD	-
WES	43	DOLEVA REAL ES	GREENFIELD M	5500	0.0055	2.01	Y	7542	ISS	GREENFIELD	-
CEN	15	DOLEVA REAL EST	GREENFIELD P	5500	0.0055	2.01	N	7542	ISS	GREENFIELD	-
WES	35	ARNOLD RUBIN	GREENFIELD P	10300	0.0103	3.76	N	7215	ISS	GREENFIELD	IND & COM LAUNDRY
WES	47	LIGHTLIFE FOODS	GREENFIELD W	2600	0.0026	0.95	N	2075	ISS	GREENFIELD	-
WES	46	DOLEVA REAL	GREENFIELD W	8580	0.0086	3.13	Y	7542	ISS	GREENFIELD	-
WES	45	JAMES C BERNIER	GREENFIELD W	3000	0.0030	1.10	Y	7215	ISS	GREENFIELD	IND & COM LAUNDRY
					0.0495	18.06					
NE	10	DIGITAL EQ	GTR LOWELL	432000	0.4320	157.68	Y	3679	ISS	ANDOVER	EL & ELTRONIC COMP
NE	13	DIGITAL EQ	GTR LOWELL S	100	0.0001	0.04	N	4225	ISS	ANDOVER	-
					0.4321	157.72					
WES	66	MATHEW M PITONIAK	HADLEY WWTP	4032	0.0040	1.47	Y	-	ISS	NHAMPTON	
NE	171	TRONICA CIR	HAVERHIL WW	100	0.0001	0.04	Y	3679	ISS	HAVERHIL	EL & ELTRONIC COMP
NE	244	ALAN KAMAL	HAVERHILL	5000	0.0050	1.83	N	-	ISS	HAVERHILL	
NE	169	GALAXY CIR	HAVERHILL	6000	0.0060	2.19	Y	3679	ISS	HAVERHILL	EL & ELTRONIC COMP

NE	160	BALSTON INC	HAVERHILL	12757	0.0128	4.66	Y	3569	ISS	HAVERHILL	EQPT MFG & ASSEMB
NE	167	CARE MANUF	HAVERHILL	800	0.0008	0.29	Y	3269	ISS	HAVERHILL	PORCELAIN
NE	161	UNIFIRST EMBLEM	HAVERHILL PO	2800	0.0028	1.02	Y	2793	ISS	HAVERHILL	PRINT & PUBL
NE	272	SHELL OIL CO	HAVERHILL PO	50	0.0001	0.02	Y	-	ISS	PAWTUCKET	
NE	177	AGFA CORP	HAVERHILL PO	3500	0.0035	1.28	Y	-	ISS	HAVERHIL	
NE	159	HOYT&WORTHEN	HAVERHILL PO	120900	0.1209	44.13	Y	3111	PEN	HAVERHILL	LEATHER TANN & PROD
NE	162	HOYT &WORTHEN	HAVERHILL PO	120000	0.1200	43.80	Y	3111	ISS	HAVERHILL	LEATHER TANN & PROD
NE	166	PRINTED CIR	HAVERHILL WP	4000	0.0040	1.46	Y	3679	ISS	HAVERHILL	EL & ELTRONIC COMP
NE	170	WILLIAM VINCENT	HAVERHILL WW	9000	0.0090	3.29	Y	3679	ISS	WARD HILL	EL & ELTRONIC COMP
NE	173	WANG LAB	HAVERHILL WW	125	0.0001	0.05	N	3573	ISS	HAVERHIL	EQPT MFG & ASSEMB
NE	168	USCI DIV	HAVERHILL WW	50	0.0001	0.02	N	3841	ISS	HAVERHILL	EQPT MFG & ASSEMB
NE	172	RUNTAL N AMERI	HAVERHILL WW	810	0.0008	0.30	N	3433	ISS	HAVERHIL	EQPT MFG & ASSEMB
NE	163	NEW ENG COAT	HAVERHILL WW	38880	0.0389	14.19	Y	3679	ISS	WARD HILL	EL & ELTRONIC COMP
NE	164	OGDEN HAVERHILL	HAVERHILL WW	16590	0.0166	6.06	N	4911	ISS	HAVERHILL	-
NE	165	OGDEN MARTIN SYS	HAVERHILL WW	30000	0.0300	10.95	N	4953	ISS	HAVERHILL	-
NE	175	ALTERNATE CIR	HAVERHILL WW	10000	0.0100	3.65	Y	3679	ISS	HAVERHIL	EL & ELTRONIC COMP
NE	174	VERNON PLAST	HAVERHILL WW	4000	0.0040	1.46	Y	3079	ISS	HAVERHIL	PLASTIC MOLD
					0.3854	140.66					
SE	107	ELECTRO SIGNAL	HINGHAM	1680	0.0017	0.61	Y	3662	ISS	HINGHAM	EL & ELTRONIC COMP
WES	13	JOHN KRZEMINSKI	HOLYOKE POTW	3909	0.0039	1.43	N	2875	ISS	HOLYOKE	PESTICIDES
WES	54	CPI PHOTO FINI	HOLYOKE POTW	0	0.0000	0.00	Y	-	ISS	HOLYOKE	PHOTOGRAPHIC
WES	48	IMPERIAL METAL	HOLYOKE POTW	170000	0.1700	62.05	Y	2796	ISS	HOLYOKE	PRINT & PUBL
WES	50	HAMPDEN PAPER	HOLYOKE WPCF	32000	0.0320	11.68	N	2671	ISS	HOLYOKE	PULP & PAPER
CEN	95	RIVERSIDE STE	HOLYOKE WWTP	273680	0.2737	99.89	Y	4911	ISS	HOLYOKKE	-
WES	82	FL ROBERTS & CO	HOLYOKE WWTP	805	0.0008	0.29	Y	7542	ISS	HOLYOKE	-
NE	56	RIVERSIDE STM	HOLYOKE WWTP	273680	0.2737	99.89	Y	4911	ISS	HOLYOKE	-
WES	51	TIMOTHY DACHOS	HOLYOKE WWTP	6000	0.0060	2.19	Y	7218	ISS	HOLYOKE	IND & COM LAUNDRY
WES	57	REPUBLIC OIL	HOLYOKE WWTP	13000	0.0130	4.75	Y	5541	ISS	HOLYOKE	PETROLEUM SERV ST
WES	53	DENNISON NAT	HOLYOKE WWTP	86000	0.0860	31.39	-	2782	ISS	HLYOKE	PRINT & PUBL
					0.8591	313.56					
CEN	69	VOGEL BROS BROW	HUDSON POTW	2340	0.0023	0.85	Y	-	PEN	WORCESTER	
CEN	20	TWN HUDSON	HUDSON POTW	10400	0.0104	3.80	N	-	ISS	HUDSON	
CEN	21	DIGITAL EQUIP	HUDSON POTW	450000	0.4500	164.25	Y	3674	ISS	HUDSON	EL & ELTRONIC COMP
					0.4627	168.90					
CEN	93	HODGES CARPET	INDIAN ORCHA	50000	0.0500	18.25	Y	-	ISS	INDIAN ORCHAR	TEXTILE
NE	178	N SHORE WEEKLI	IPSWICH POTW	2950	0.0030	1.08	Y	-	ISS	IPSWICH	
					0.0530	19.33					
CEN	26	POLYSAR INC.	LEOMINSTER P	3000	0.0030	1.10	N	2821	ISS	LEOMINSTER	PLASTIC RES & SYNT
CEN	25	ENTECH FINISH	LEOMINSTER W	2000	0.0020	0.73	Y	3471	ISS	LEOMINSTER	ELECTRO & MET FIN
CEN	22	GEN-PAK PLAST	LEOMINSTER W	7116	0.0071	2.60	Y	2821	ISS	LEOMINSTER	PLASTIC RES & SYNT
CEN	87	SYNTOZA CORP	LEOMINSTER W	15000	0.0150	5.48	Y	-	ISS	LEOMINSTER	
NE	57	SYNTOZA CORP	LEOMINSTER W	15000	0.0150	5.48	Y	-	ISS	BOSTON	
CEN	23	OMNIREL CORP	LEOMINSTER W	500	0.0005	0.18	Y	3674	ISS	LEOMINSTER	EL & ELTRONIC COMP
CEN	24	MODERN DISP	LEOMINSTER W	600	0.0006	0.22	Y	2821	ISS	LEOMINSTER	PLASTIC RES & SYNT
					0.0432	15.77					
NE	40	IRON HORSE PK	LETCHWORTH W	7050	0.0071	2.57	Y	2431	ISS	BILLERICA	TIMBER PROD
NE	179	ARATEX SER	GTR LAWR	45000	0.0450	16.43	Y	7218	ISS	LAWRENCE	IND & COM LAUNDRY
NE	181	MALDEN MILLS	GTR LAWR	75000	0.0750	27.38	N	2262	ISS	LAWRENCE	TEXTILE MILLS
NE	17	GENETICS INST	GTR LAWRENCE	13200	0.0132	4.82	Y	2834	PEN	ANDOVER	PHOTOGR CHEM
NE	188	KENNETH MACOUL	GTR LAWRENCE	650	0.0007	0.24	N	-	ISS	LAWRENCE	
NE	285	NORTON/TRW CER	GTR LAWRENCE	1000	0.0010	0.37	N	-	ISS	SALEM,N.H	
NE	180	JOHN C TOMB	GTR LAWRENCE	75	0.0001	0.03	N	-	PEN	LAWRENCE	
NE	176	OGDEN MARTIN SY	GTR LAWRENCE	391400	0.3914	142.86	Y	4953	ISS	HAVERHIL	-
NE	183	EVERETT MILLS S	GTR LAWRENCE	7850	0.0079	2.87	N	7128	ISS	LAWRENCE	-
NE	11	RAYTHEON CO	GTR LAWRENCE	24850	0.0249	9.07	Y	3674	ISS	ANDOVER	EL & ELTRONIC COMP
NE	12	RAYTHEON CO	GTR LAWRENCE	56000	0.0560	20.44	Y	3674	ISS	ANDOVER	EL & ELTRONIC COMP
NE	15	SES INC.	GTR LAWRENCE	2300	0.0023	0.84	Y	3674	ISS	ANDOVER	EL & ELTRONIC COMP
NE	186	SPRAY-G-MATIC	GTR LAWRENCE	50000	0.0500	18.25	Y	3479	ISS	LAWRENCE	ELECTRO & MET FIN

NE	185	GATO REALTY T	GTR LAWRENCE	50000	0.0500	18.25	Y	3479	ISS	LAWRENCE	ELECTRO & MET FIN
NE	19	HEWLWTT-PACK	GTR LAWRENCE	0	0.0000	0.00	-	3841	PEN	ANDOVER	EQPT MFG & ASSEMB
NE	16	HEWLETT-PACKARD	GTR LAWRENCE	84740	0.0847	30.93	Y	3841	PEN	ANDOVER	EQPT MFG & ASSEMB
NE	18	HEWLETT-PACK	GTR LAWRENCE	0	0.0000	0.00	-	3841	PEN	ANDOVER	EQPT MFG & ASSEMB
NE	32	GCA CORP	GTR LAWRENCE	21000	0.0210	7.67	-	2751	ISS	LAWRENCE	PRINT & PUBL
NE	182	NEWWARK ATL PAP	GTR LAWRENCE	600000	0.6000	219.00	N	2631	ISS	LAWRENCE	PULP & PAPER
NE	184	MALDEN MILLS IN	GTR LAWRENCE	75000	0.0750	27.38	N	2262	ISS	LAWRENCE	TEXTILE MILLS
NE	313	MCDONALD'S CORP	GTR LAWRENCE	748	0.0007	0.27	Y	2399	ISS	LAWRENCE	TEXTILE MILLS
NE	268	NESWC RESOURCE REC	GTR LAWRENCE	1180000	1.1800	430.70	N	4953	ISS	NANDOVER	-
NE	331	ALPHA INDUS	GTR LAWRENCE	0	0.0000	0.00	Y	3674	ISS	WOBURN	EL & ELTRONIC COMP
NE	329	ALPHA INDUS	GTR LAWRENCE	250	0.0003	0.09	Y	6512	ISS	WOBURN	ELEC & EL COMP
NE	330	ALPHA INDUS	GTR LAWRENCE	250	0.0003	0.09	Y	6512	ISS	WOBURN	ELEC & EL COMP
NE	14	AEGEAN IND	GTR LAWRENCE	60000	0.0600	21.90	-	-	ISS	ANDOVER	
NE	92	CH ENVIRO ENG	GTR LAWRENCE	0	0.0000	0.00	Y	-	ISS	BRAINTREE	
NE	93	CH ENVIRO ENG	GTR LAWRENCE	0	0.0000	0.00	N	-	ISS	LAWRENCE	
NE	245	MASSE CIRC	GTR LAWRENCE	4800	0.0048	1.75	Y	3679	ISS	METHUEN	EL & ELTRONIC COMP
NE	286	JOSEPH NASSER JR	GTR LAWRENCE	3500	0.0035	1.28	Y	3471	ISS	SALEM	ELECTRO & MET FIN
NE	189	INSTRUMENTATION	GTR LAWRENCE	2000	0.0020	0.73	-	3811	ISS	LEXINGTON	EQPT MFG & ASSEMB
NE	328	BRODIE INC.	GTR LAWRENCE	50	0.0001	0.02	Y	3537	ISS	LAWRENCE	EQPT MFG & ASSEMB
					2.7497	1003.6					
NE	125	FREQUENCY SOURCES	LOWELL	13000	0.0130	4.75	Y	3674	ISS	LOWELL	EL & ELTRONIC COMP
NE	218	PELLON CORP	LOWELL	250000	0.2500	91.25	-	2299	ISS	LOWELL	TEXTILE MILLS
NE	42	J&C MANAG	LOWELL POTW	3002	0.0030	1.10	Y	-	PEN	BILLERICA	
NE	27	L'ENERGIA IN	LOWELL POTW	154360	0.1544	56.34	Y	4931	ISS	LOWELL	-
NE	223	CITY OF LOWELL	LOWELL POTW	35000	0.0350	12.78	Y	4953	ISS	LOWELL	-
NE	276	STAR ENTERPRISE	LOWELL POTW	21500	0.0215	7.85	Y	5533	ISS	PROVIDENCE	-
NE	192	CIR TECH INC	LOWELL POTW	3100	0.0031	1.13	Y	3679	WIT	LOWELL	EL & ELTRONIC COMP
NE	146	UNITED CIRCUTIS	LOWELL POTW	34000	0.0340	12.41	Y	3672	PEN	DRACUT	EL & ELTRONIC COMP
NE	194	T ANODIZING	LOWELL POTW	7200	0.0072	2.63	Y	-	PEN	LOWELL	ELECTROPLAT
NE	222	IONPURE TECH	LOWELL POTW	63000	0.0630	23.00	Y	3559	PEN	LOWELL	EQPT MFG & ASSEMB
NE	193	IONPURE TECH	LOWELL POTW	63000	0.0630	23.00	Y	3559	ISS	LOWELL	EQPT MFG & ASSEMB
NE	127	COMET PROD	LOWELL POTW	4450	0.0045	1.62	N	3089	ISS	CHELSFORD	PLASTIC MOLD
NE	207	M P C INC	LOWELL W WT	8000	0.0080	2.92	Y	3679	ISS	LOWELL	EL & ELTRONIC COMP
NE	220	WANG LABS	LOWELL WASTE	90000	0.0900	32.85	-	-	ISS	LOWELL	ELEC & ELECTRO
NE	214	WANG LABS	LOWELL WASTE	200	0.0002	0.07	Y	3573	ISS	LOWELL	EQPT MFG & ASSEMB
NE	95	NORMAC ASSOC	LOWELL WW	135000	0.1350	49.28	Y	-	ISS	BURLINGTON	
NE	204	CIRTECH INC	LOWELL WW	4200	0.0042	1.53	Y	3679	ISS	LOWELL	EL & ELTRONIC COMP
NE	201	ELECTRO CIR	LOWELL WW	40000	0.0400	14.60	Y	3679	ISS	LOWELL	EL & ELTRONIC COMP
NE	206	MULTI CORE	LOWELL WW	122000	0.1220	44.53	Y	3679	ISS	LOWELL	EL & ELTRONIC COMP
NE	203	POPE INDUS	LOWELL WW	3000	0.0030	1.10	Y	3679	ISS	LOWELL	EL & ELTRONIC COMP
NE	200	GENERAL AIRCRAFT	LOWELL WW	7560	0.0076	2.76	Y	3679	ISS	LOWELL	EL & ELTRONIC COMP
NE	294	ASTRO CIR	LOWELL WW	80000	0.0800	29.20	-	-	ISS	LOWELL	ELECTROPLAT
NE	212	WANG LABS	LOWELL WW	200	0.0002	0.07	N	3574	ISS	LOWELL	EQPT MFG & ASSEMB
NE	209	INTERSTATE EXEC	LOWELL WW	1696	0.0017	0.62	Y	3573	ISS	LOWELL	EQPT MFG & ASSEMB
NE	216	WANG LABS	LOWELL WW	8900	0.0089	3.25	Y	3573	ISS	LOWELL	EQPT MFG & ASSEMB
NE	211	G.A.&T PAPPAD	LOWELL WW	11600	0.0116	4.23	N	7215	ISS	LOWELL	IND & COM LAUNDRY
NE	133	TEXACO INC	LOWELL WW	170	0.0002	0.06	-	-	ISS	LOWELL	PETROLEUM
NE	221	LAWRENCE MANUF	LOWELL WW	200000	0.2000	73.00	-	2259	ISS	LOWELL	TEXTILE MILLS
NE	122	3M COMPANY	LOWELL WW FA	3950	0.0040	1.44	N	3069	ISS	CHELMSFORD	PLASTIC MOLD
NE	197	COLONIAL GAS	LOWELL WW UT	4000	0.0040	1.46	Y	4924	ISS	LOWELL	-
NE	149	PRECISION SCREEN	LOWELL WW UT	2100	0.0021	0.77	Y	3679	ISS	DRACUT	EL & ELTRONIC COMP
NE	116	OPTRONICS	LOWELL WW UT	1200	0.0012	0.44	Y	3861	ISS	CHELMSFORD	EQPT MFG & ASSEMB
NE	123	CARE CLEAMERS	LOWELL WW UT	6000	0.0060	2.19	N	7215	ISS	CHELMSFORD	IND & COM LAUNDRY
NE	198	LEEMAN LABS	LOWELL WW UT	60	0.0001	0.02	Y	3826	ISS	LOWELL	EQPT MFG & ASSEMB
NE	205	MR FITZGIBBON	LOWELL WWTF	9600	0.0096	3.50	N	-	ISS	DRACUT	
NE	199	JET-LINE LOWELL	LOWELL WWTF	250	0.0003	0.09	Y	8611	ISS	LOWELL	-
NE	119	PKS RLTY TR	LOWELL WWTF	5000	0.0050	1.83	N	7011	ISS	CHELMSFORD	-
NE	121	SILICON TRANSIS	LOWELL WWTF	40000	0.0400	14.60	Y	3674	ISS	CHELMSFORD	EL & ELTRONIC COMP
NE	208	CIRCUIT SER	LOWELL WWTF	40000	0.0400	14.60	Y	3679	ISS	LOWELL	EL & ELTRONIC COMP
NE	293	DELTA TECH	LOWELL WWTF	0	0.0000	0.00	Y	3469	ISS	TEWKSBURY	ELECTRO & MET FIN

NE	215	WANG LABS	LOWELL WWTF	120	0.0001	0.04	N	3573	ISS	LOWELL	EQPT MFG & ASSEMB
NE	150	LCA REALTY TR	LOWELL WWTF	4800	0.0048	1.75	Y	7215	ISS	DRACUT	IND & COM LAUNDRY
NE	202	MCMAHON'S LAUN	LOWELL WWTP	8000	0.0080	2.92	N	-	ISS	LOWELL	
NE	126	RAYMOND SECOR	LOWELL WWTP	1150	0.0012	0.42	N	7215	ISS	N CHELMSFORD	IND & COM LAUNDRY
NE	147	SYNTHETIC LABS	LOWELL WWTP	150	0.0002	0.05	Y	2841	ISS	DRACUT	INORG CHEM
NE	284	WGT CORP	LOWELL WWTP	16800	0.0168	6.13	N	2841	ISS	READING	INORG CHEM
					1.5073	550.17					
WES	83	FL ROBERTS & CO	LUDLOW	5000	0.0050	1.83	N	7542	ISS	LUDLOW	-
NE	231	GENERAL ELEC	LYNN	1900	0.0019	0.69	Y	3722	ISS	LYNN	EQPT MFG & ASSEMB
NE	234	EASTERN SMELTING	LYNN	1000	0.0010	0.37	Y	3339	ISS	LYNN	NONFERROUS MET MFG
NE	235	WEST LYNN CREAM	LYNN POTW	0	0.0000	0.00	-	2020	PEN	LYNN	-
NE	224	N.AMERICA PHIL	LYNN POTW	4500	0.0045	1.64	Y	3641	WIT	LYNN	EL & ELTRONIC COMP
NE	227	CL HAUTHWAY	LYNN WCPLT	1200	0.0012	0.44	Y	2891	ISS	LYNN	ADHESIVES & SEAL
NE	229	GENERAL ELECT	LYNN WTF	7200	0.0072	2.63	Y	3722	ISS	LYNN	EQPT MFG & ASSEMB
NE	232	N AMER PHIL LI	LYNN WTP	1440	0.0014	0.53	Y	3641	ISS	LYNN	EL & ELTRONIC COMP
NE	225	JOHN BOYD CO	LYNN WW	75000	0.0750	27.38	Y	2099	ISS	LYNN	-
NE	230	W LYNN CCREAMERY	LYNN WW	777166	0.7772	283.67	N	2026	ISS	LYNN	-
NE	233	JOHN BOYD SHIP	LYNN WWTF	48000	0.0480	17.52	-	2099	ISS	LYNN	-
NE	228	GENERAL ELECT	LYNN WWTF	144000	0.1440	52.56	Y	3722	ISS	LYNN	EQPT MFG & ASSEMB
NE	226	UNIVERSAL POLYMER	LYNN WWTF	500	0.0005	0.18	N	-	ISS	LYNN	PLASTIC RES
					1.0619	387.60					
SE	78	AVON PROD	MANSFIELD	72000	0.0720	26.28	-	-	ISS	MANSFIELD	
CEN	81	NICKS REALTY TR	MANSFIELD	4780	0.0048	1.74	Y	4780	ISS	MANSFIELD	-
SE	74	NICKS REALTY TRUST	MANSFIELD	4780	0.0048	1.74	Y	4780	ISS	MANSFIELD	-
SE	77	DATEL	MANSFIELD	8000	0.0080	2.92	Y	3674	ISS	MANSFIELD	EL & ELTRONIC COMP
SE	61	THE FOXBORO CO	MANSFIELD	75000	0.0750	27.38	Y	3815	ISS	FOXBORO	EQPT MFG & ASSEMB
NE	54	CABOT COBAT FORB	MANSFIELD W	38	0.0000	0.01	Y	-	ISS	BOSTON	
SE	72	HOECHST CERAMTE	MANSFIELD PO	1721	0.0017	0.63	N	3679	ISS	MANSFIELD	EL & ELTRONIC COMP
SE	79	BLANE POLYMERS	MANSFIELD PO	200000	0.2000	73.00	N	3079	PEN	MANSFIELD	PLASTIC MOLD
SE	75	ISPO INC.	MANSFIELD WP	500	0.0005	0.18	-	2851	ISS	MANSFIELD	GUM & WOOD CHEM
SE	73	THE KENDALL	MANSFIELD WT	3500	0.0035	1.28	Y	-	ISS	MANSFIELD	
SE	76	TEXAS INSTRU	MANSFIELD WW	7320	0.0073	2.67	N	3436	ISS	MANSFIELD	EQPT MFG & ASSEMB
					0.3776	137.84					
SE	81	FREDDERICK T IDD	MARION TRT	4842	0.0048	1.77	N	7542	ISS	MARION	-
CEN	80	FREDERICK T IDD	MARION TRT	4842	0.0048	1.77	Y	7542	-	MARION	-
					0.0097	3.53					
NE	153	KEN'S FOODS	MARLBORO	25600	0.0256	9.34	Y	2035	ISS	FRAMINGHAM	-
CEN	30	ALLOY COMPU	MARLBORO EAS	60	0.0001	0.02	Y	3823	ISS	MARLBORO	EQPT MFG & ASSEMB
CEN	27	DAV-TECH PL	MARLBORO POT	131000	0.1310	47.82	Y	3471	PEN	MARLBORO	ELECTRO & MET FIN
NE	266	SHIPLEY CO INC	MARLBORO WES	31000	0.0310	11.32	-	7397	ISS	NEWTON	-
CEN	73	KENS FOODS INC	MARLBORO WES	25600	0.0256	9.34	Y	2035	ISS	MARLBORO	-
NE	22	FENWAL SAFETY SYS	MARLBORO WES	3600	0.0036	1.31	Y	3622	ISS	MARLBORO	EL & ELTRONIC COMP
CEN	31	ADCOLE CORP	MARLBORO WES	500	0.0005	0.18	-	3999	ISS	MARLBORO	ELECTROPL & METAL FIN
CEN	74	SUPERIOR PRINTING	MARLBORO WWT	0	0.0000	0.00	Y	2893	ISS	MARLBORO	INK MFG & FOAM
SE	65	SUPERIOR PRINT	MARLBORO WWT	5984	0.0060	2.18	N	2893	ISS	MARLBOROUGH	INK MFG & FOAM
					0.2233	81.52					
NE	87	NEW ENG MED	MDC	19200	0.0192	7.01	-	-	ISS	BOSTON	
NE	53	BOSTON UNIV	MDC	10800	0.0108	3.94	Y	-	ISS	BOSTON	
NE	111	BIOPURE CORP	MDC	0	0.0000	0.00	-	-	PEN	CAMBRIDGE	
NE	98	CENETICS INST	MDC	47000	0.0470	17.16	Y	-	ISS	CAMBRIDGE	
NE	337	LOCKE MANUF	MDC	3600	0.0036	1.31	-	-	ISS	WOBURN	
NE	113	PINE ST RLTY CO	MDC	300	0.0003	0.11	Y	-	ISS	CANTON	
NE	67	CC&F WELLINTON	MDC	11	0.0000	0.00	Y	-	ISS	MEDFORD	
NE	115	CIRTECH CORP	MDC	8000	0.0080	2.92	Y	-	ISS	CANTON	
NE	72	BOSTON PROP	MDC	50	0.0001	0.02	N	7391	ISS	BOSOTON	-
NE	283	INTERN'L CLIN	MDC	200	0.0002	0.07	Y	8071	ISS	RANDOLPH	-
NE	104	MOLECULOW BIO	MDC	1155	0.0012	0.42	Y	1834	ISS	CAMBRIDGE	-
NE	253	DURACELL	MDC	2350	0.0024	0.86	Y	7391	ISS	NEEDHAM	BATTERY
NE	290	AMERICAN ELECT	MDC	50000	0.0500	18.25	-	3471	ISS	SOMERVILLE	ELECTRO & MET FIN

NE	90	AINSLIE	MDC	6000	0.0060	2.19	Y	3471	ISS	BRAINTREE	ELECTRO & MET FIN
NE	249	DURALECTRA INC	MDC	35000	0.0350	12.78	Y	3479	ISS	NATICK	ELECTRO & MET FIN
NE	114	JAMES M SALAH	MDC	2450	0.0025	0.89	Y	3576	ISS	CANTON	EQPT MFG & ASSEMB
NE	131	SYNTHON IND	MDC	95000	0.0950	34.68	Y	2297	ISS	CHELSEA	TEXTILE MILLS
NE	105	POLARIOD CORP	MDC DEER IS	23000	0.0230	8.40	Y	3674	ISS	CAMBRIDGE	EL & ELTRONIC COMP
NE	335	INTERCIRCUIT	MDC DEER IS	57600	0.0576	21.02	Y	3479	ISS	WOBURN	ELECTRO & MET FIN
NE	300	POLAROID CORP	MDC DEER IS	550000	0.5500	200.75	Y	386	ISS	WALTHAM	PHOTOGRAPHIC EQ
NE	307	AMERICAN SUPER CON	MDC DEER ISL	100	0.0001	0.04	Y	-	ISS	WATERTOWN	
NE	310	GASTON ANDREY ASSOC	MDC DEER ISL	750	0.0008	0.27	Y	7538	ISS	WATERTOWN	-
NE	68	C WALSH CORP	MDC DEER ISL	19000	0.0190	6.94	N	7395	ISS	BOSTON	PHOTOGRAPHIC
NE	298	EASTERN REPROD	MDC DEER ISL	5200	0.0052	1.90	Y	2499	ISS	WALTHAM	TIMBER PROD
NE	30	SPI-TRUST	MDC DEER ISL	3000	0.0030	1.10	Y	3674	ISS	BEDFORD	EL & ELTRONIC COMP
NE	31	CONTINENTAL CAN	MDC DEER ISL	145	0.0001	0.05	Y	2753	ISS	BEDFORD	PRINT & PUBL
NE	240	M M REALTY TRUST	MDC TRUNKLIN	315	0.0003	0.11	N	-	ISS	MEDFORD	
					0.9402	343.18					
NE	238	420 CORP	MEDFIELD	3095	0.0031	1.13	N	-	ISS	MEDFIELD	
SE	66	GARELICK FARMS	MEDWAY REG S	368000	0.3680	134.32	-	2026	ISS	FRANKLIN	-
NE	242	COASTAL METAL FIN	MERRIMAC	40000	0.0400	14.60	Y	3471	ISS	MERRIMAC	ELECTRO & MET FIN
					0.4111	150.05					
SE	67	J&J REALTY TR	MIDDLEBORO	1710	0.0017	0.62	N	-	PEN	HINGHAM	
SE	84	OCEAN SPRAY CRAN	MIDDLEBORO	865000	0.8650	315.73	Y	2033	ISS	MIDDLEBORO	-
SE	82	OCEAN SPRAY CRAN	MIDDLEBORO P	656000	0.6560	239.44	Y	2033	ISS	MIDDLEBORO	-
SE	83	LH CHACE & SON	MIDDLEBORO W	5	0.0000	0.00	Y	5511	ISS	MIDDLEBORO	-
CEN	79	LH CHASE &S	MIDDLEBORO W	0	0.0000	0.00	Y	5511	ISS	MIDDLEBORO	-
					1.5227	555.79					
CEN	37	E-Z WAY WASH	MILFORD	900	0.0009	0.33	-	-	ISS	MILFORD	
CEN	38	MILFORD SHOE	MILFORD	600	0.0006	0.22	-	-	ISS	MILFORD	LEATHER & TANN
CEN	35	PHOTOFAB	MILFORD SEW	15000	0.0150	5.48	Y	3479	ISS	MILFORD	ELECTRO & MET FIN
NE	154	HOWARD A FAFARD	MILFORD STP	48000	0.0480	17.52	-	-	ISS	FRAMINGHAM	
NE	24	HOWARD A FAFARD	MILFORD STP	38400	0.0384	14.02	-	-	ISS	MILFORD	
CEN	33	ENGELHARD-PRE	MILFORD TRT	13000	0.0130	4.75	Y	3679	ISS	MILFORD	EL & ELTRONIC COMP
CEN	34	AJ KNOT TOOL	MILFORD TRT	600	0.0006	0.22	Y	-	ISS	MILFORD	IRON & STEEL MFG
CEN	32	AMERICAN NAT'L CAN	MILFORD WWTF	233580	0.2336	85.26	Y	3211	ISS	MILFORD	GLASS
CEN	36	WATERS ASSOC	MILFORD WWTP	2025	0.0020	0.74	Y	3811	ISS	MILFORD	EQPT MFG & ASSEMB
					0.3521	128.52					
CEN	42	LEWCOTT CORP	MILLBURY	400	0.0004	0.15	Y	2295	ISS	MILBURY	TEXTILE MILLS
CEN	65	PARK INVESTMEN	MILLBURY WWT	2950	0.0030	1.08	N	-	ISS	WORCESTER	
CEN	43	JD LEASING	MILLBURY WWT	6000	0.0060	2.19	Y	3671	ISS	MILBURY	EL & ELTRONIC COMP
CEN	41	ERIC NORDSTROM	MILLBURY WWT	5050	0.0051	1.84	N	7215	ISS	MILBURY	IND & COM LAUNDRY
					0.0144	5.26					
NE	316	MCDONALD'S CORP	MILLIS	3500	0.0035	1.28	-	2399	ISS	WESTWOOD	TEXTILE MILLS
WES	64	AQUAFUTURE	MONTAGUE POT	4000	0.0040	1.46	N	-	ISS	MONTAGUE	
WES	122	INDECK ENERG	MONTAGUE SEW	50000	0.0500	18.25	Y	4311	ISS	MONTAQUE	-
CEN	91	AQUA FUTURE INC	MONTAGUE WWT	2000	0.0020	0.73	Y	-	ISS	MONTAGUE	
					0.0560	20.44					
NE	83	BU SCIENCE&ENG	MWRA	29000	0.0290	10.59	-	-	ISS	BOSTON	
NE	275	AMTRAK	MWRA	18000	0.0180	6.57	-	-	ISS	BOSTON	
NE	109	BIOTECH INT'L	MWRA	40000	0.0400	14.60	-	-	ISS	CAMBRIDGE	
NE	62	CC&F MYSTIC	MWRA	240	0.0002	0.09	N	-	ISS	MEDFORD	
NE	132	TOWN&COUNTRY JEW	MWRA	0	0.0000	0.00	-	-	ISS	CHELSEA	
NE	108	B LEASING	MWRA	12000	0.0120	4.38	-	-	ISS	CAMBRIDGE	
NE	78	MED AREA TOT	MWRA	80000	0.0800	29.20	-	-	ISS	BOSTON	
NE	302	THE JET SPRAY	MWRA	22000	0.0220	8.03	-	-	ISS	WALTHAM	
NE	60	CC&F MYSTIC	MWRA	4272	0.0043	1.56	-	-	ISS	MEDFORD	
NE	63	CC&F MYSTIC	MWRA	3300	0.0033	1.20	N	-	ISS	MEDFORD	
NE	139	DEDHAM WATER	MWRA	40000	0.0400	14.60	-	-	ISS	DEDHAM	
NE	277	BIO-MEDICAL	MWRA	2700	0.0027	0.99	N	-	ISS	QUINCY	
NE	86	ETC DEVELOPERS	MWRA	10000	0.0100	3.65	-	-	ISS	BOSTON	
NE	255	HERTZ CORP	MWRA	2500	0.0025	0.91	-	-	ISS	NEW YORK	

NE	59	CC&F MYSTIC	MWRA	3860	0.0039	1.41	N	-	ISS	MEDFORD	
NE	145	HOSP LAUNDRY	MWRA	0	0.0000	0.00	Y	-	PEN	DORCHESTER	
NE	317	DAMON CLINICAL	MWRA	3400	0.0034	1.24	Y	-	ISS	WESTWOOD	
NE	58	CC&F MYSTIC	MWRA	3860	0.0039	1.41	N	-	ISS	MDFORD	
NE	65	CC&F MYSTIC	MWRA	26260	0.0263	9.58	N	-	ISS	MEDFORD	
NE	61	CC&F MYSTIC	MWRA	4088	0.0041	1.49	N	-	ISS	MEDFORD	
NE	103	ENSECO	MWRA	492	0.0005	0.18	Y	-	ISS	CAMBRIDGE	
NE	190	INTERNEURON PH	MWRA	700	0.0007	0.26	Y	-	PEN	LEXINGTON	
NE	64	CC&F MYSTIC	MWRA	3860	0.0039	1.41	N	-	ISS	MEDFORD	
NE	66	CC&F WELLINTON	MWRA	5200	0.0052	1.90	N	-	ISS	MEDFORD	
NE	304	BIO-MED APP.	MWRA	0	0.0000	0.00	-	-	PEN	WALTHAM	
NE	84	GENETICS INS	MWRA	400	0.0004	0.15	-	-	ISS	BOSTON	
SE	113	FEDERAL EXPRESS	MWRA	600	0.0006	0.22	-	-	ISS	TAUNTON	
NE	45	MASS PORT AUT	MWRA	210000	0.2100	76.65	Y	9621	PEN	BOSTON	-
NE	79	MBTA	MWRA	110000	0.1100	40.15	-	4582	ISS	BOSTON	-
NE	301	GTE LABS	MWRA	102000	0.1020	37.23	Y	8980	ISS	WALTHAM	-
NE	82	MASS GENERAL H	MWRA	9600	0.0096	3.50	-	8062	ISS	BOSTON	-
NE	247	H.P.HOOD	MWRA	48706	0.0487	17.78	Y	2024	PEN	MILTON	-
NE	112	ORGANOENSIS INC	MWRA	5160	0.0052	1.88	Y	7391	ISS	CANTON	-
NE	267	NEWTON WELLESLEY HSP	MWRA	0	0.0000	0.00	-	8062	PEN	NEWTON	-
NE	94	THE DUPONT CO	MWRA	30	0.0000	0.01	Y	8734	ISS	BURLINGTON	-
NE	81	BRIGHAM&WO	MWRA	6680	0.0067	2.44	-	8062	ISS	BOSTON	-
NE	110	MIT-CENTER 4 CAN	MWRA	11500	0.0115	4.20	-	8221	ISS	CAMBRIDGE	-
NE	107	AMERICAN SCIENC	MWRA	3200	0.0032	1.17	-	6512	ISS	CAMBRIDGE	-
NE	48	JET -A-WAY	MWRA	31000	0.0310	11.32	Y	4953	ISS	BOSTON	-
NE	85	BETH ISRAEL HP	MWRA	6500	0.0065	2.37	-	8062	ISS	BOSTON	-
NE	271	NORWOOD PARK S	MWRA	12040	0.0120	4.39	-	6531	ISS	NORWOOD	-
NE	52	BOSTON EDISON	MWRA	5400	0.0054	1.97	N	4961	ISS	BOSTON	-
NE	51	JOHN HANCOCK MUT	MWRA	3855	0.0039	1.41	Y	6311	ISS	BOSTON	-
NE	23	BOSTON BATTERY REC	MWRA	1600	0.0016	0.58	-	-	ISS	ASHLAND	BATTERY MFG
NE	251	DURACELL INC	MWRA	0	0.0000	0.00	-	-	PEN	NEEDHAM	BATTERY MFG
NE	96	MICROWAVE ASSOC	MWRA	7680	0.0077	2.80	-	3662	ISS	BURLINGTON	EL & ELTRONIC COMP
NE	320	ANALOG DEVICES	MWRA	304500	0.3045	111.14	Y	3674	ISS	WILMINGTON	EL & ELTRONIC COMP
NE	336	PRINTED CIR	MWRA	150000	0.1500	54.75	-	3679	ISS	WOBURN	EL & ELTRONIC COMP
NE	326	ALTRON INC	MWRA	100000	0.1000	36.50	Y	3679	ISS	WILMINGTON	EL & ELTRONIC COMP
NE	241	GENERAL ELEC	MWRA	4320	0.0043	1.58	-	3621	ISS	MEDFORD	EL & ELTRONIC COMP
NE	324	AVCO SYS	MWRA	264000	0.2640	96.36	Y	3471	ISS	WILMINGTON	ELECTRO & MET FIN
NE	69	GILLETTE CO	MWRA	170	0.0002	0.06	N	3421	ISS	BOSTON	ELECTRO & MET FIN
NE	144	ARBORWY METAL	MWRA	3550	0.0036	1.30	Y	3471	ISS	DORCHESTER	ELECTRO & MET FIN
NE	236	F.M.CALLAHAN	MWRA	29000	0.0290	10.59	Y	3471	PEN	MALDEN	ELECTRO & MET FIN
NE	291	HONORCRAFT INC	MWRA	1040	0.0010	0.38	Y	3999	PEN	STOUGHTON	ELECTROPL & METAL FIN
NE	33	COMPUTERVIS CO	MWRA	4320	0.0043	1.58	-	3537	ISS	BEDFORD	EQPT MFG & ASSEMB
NE	80	TERADYNE	MWRA	3000	0.0030	1.10	-	3825	ISS	BOSTON	EQPT MFG & ASSEMB
NE	321	UNITED SHOE MACHNRY	MWRA	400	0.0004	0.15	Y	3544	ISS	WILMINGTON	EQPT MFG & ASSEMB
NE	254	INTERNATIONAL EQU	MWRA	7250	0.0073	2.65	Y	3841	PEN	NEEDHAM HTS	EQPT MFG & ASSEMB
NE	106	VAPPI& CO	MWRA	1700	0.0017	0.62	-	2899	ISS	CAMBRIDGE	EXPLOSIVES
NE	47	THE LAUNDRY CL	MWRA	14400	0.0144	5.26	N	7213	ISS	BOSTON	IND & COM LAUNDRY
CEN	45	GANNETT CO	MWRA	5150	0.0052	1.88	Y	2867	ISS	NORWOOD	ORG CHEM MFG
NE	332	WOBBURN FOR MOTO	MWRA	3000	0.0030	1.10	N	5541	ISS	WOBURN	PETROLEUM SERV ST
NE	270	BIKEN SEPAR	MWRA	6425	0.0064	2.35	N	2821	ISS	NORWOOD	PLASTIC RES & SYNT
NE	325	SWEETHEART PLASTICS	MWRA	9792	0.0098	3.57	N	307	ISS	WILMINGTON	PLASTICS
NE	278	THE PATRIOT L	MWRA	1000	0.0010	0.37	Y	2751	ISS	QUINCY	PRINT & PUBL
NE	44	CHADIS PRINTING	MWRA	2135	0.0021	0.78	Y	2751	ISS	BOSTON	PRINT & PUBL
NE	323	SCREENPRINT/DOW	MWRA	170	0.0002	0.06	Y	2751	ISS	WILMINGTON	PRINT & PUBL
NE	75	GRAPHICS REALTY	MWRA	1460	0.0015	0.53	-	-	ISS	BOSTON	PRINT & PUBL
NE	296	HOLLINGSWORTH &VOSE	MWRA	1000000	1.0000	365.00	Y	2621	ISS	WALPOLE	PULP & PAPER
NE	46	PATRIOT PAPER	MWRA	2004375	2.0044	731.60	Y	-	ISS	BOSTON	PULP & PAPER
NE	29	MABBETT CAP ASC	MWRA DEER IS	160	0.0002	0.06	Y	-	ISS	BEDFORD	
NE	333	INSULTAB INC	MWRA DEER IS	13500	0.0135	4.93	N	3079	ISS	WOBURN	PLASTIC MOLD
NE	101	T-CELL SCIENCES	MWRA DEER IS	2700	0.0027	0.99	Y	-	ISS	CAMBRIDGE	

NE	318	E.C. WHITNEY S	MWRA DEER IS	650	0.0007	0.24	Y	-	PEN	WILMINGTON	
NE	102	FOREST CITY DEV	MWRA DEER IS	2700	0.0027	0.99	Y	-	ISS	CAMBRIDGE	
NE	280	ARES ADVANCED	MWRA DEER IS	750	0.0008	0.27	Y	8731	PEN	RANDOLPH	-
SE	60	EVERETT ENER C	MWRA DEER IS	25200	0.0252	9.20	Y	4931	PEN	FALMOUTH	-
NE	99	TREMONT ONE ASSOC	MWRA DEER IS	5	0.0000	0.00	Y	8811	ISS	CAMBRIDGE	-
NE	309	ARMY MATERIALS TECH	MWRA DEER IS	23040	0.0230	8.41	Y	8733	ISS	WATERTOWN	-
NE	305	ARMY MATERIALS	MWRA DEER IS	25320	0.0253	9.24	Y	8733	ISS	WATERTOWN	-
NE	97	POLARIOD CORP	MWRA DEER IS	38000	0.0380	13.87	Y	3674	ISS	CAMBRIDGE	EL & ELTRONIC COMP
NE	327	AERO BRAZING CORP	MWRA DEER IS	2680	0.0027	0.98	Y	3679	ISS	WOBURN	EL & ELTRONIC COMP
NE	308	SWISSTRONICS	MWRA DEER IS	8100	0.0081	2.96	Y	3451	ISS	WATERTOWN	ELECTRO & MET FIN
NE	151	HI-TECH PLAT	MWRA DEER IS	40000	0.0400	14.60	Y	3471	ISS	EVERETT	ELECTRO & MET FIN
NE	306	BARRY CONTROLS	MWRA DEER IS	33650	0.0337	12.28	Y	3499	ISS	BRIGHTON	ELECTRO & MET FIN
NE	297	BIRD MACHINE	MWRA DEER IS	146800	0.1468	53.58	Y	3969	PEN	WALPOLE	ELECTROPL & METAL FIN
NE	142	UNIFIRST CORP	MWRA DEER IS	216000	0.2160	78.84	Y	7218	ISS	DORCHESTER	IND & COM LAUNDRY
NE	141	STANDARD UNIF	MWRA DEER IS	40000	0.0400	14.60	Y	7218	ISS	DORCHESTER	IND & COM LAUNDRY
NE	140	UNIFIRST CORP	MWRA DEER IS	216000	0.2160	78.84	Y	7218	ISS	DORCHESTER	IND & COM LAUNDRY
NE	264	NRC INC.	MWRA DEER IS	10600	0.0106	3.87	Y	3339	PEN	NEWTON	NONFERROUS MET MFG
NE	265	NRC INC.	MWRA DEER IS	7250	0.0073	2.65	Y	3339	ISS	NEWTON	NONFERROUS MET MFG
NE	279	SEROND LABS	MWRA DEER IS	18100	0.0181	6.61	Y	2834	ISS	RANDOLPH	PHOTOGR CHEM
NE	281	SERONO LABS	MWRA DEER IS	15350	0.0154	5.60	Y	2834	ISS	RANDOLPH	PHOTOGR CHEM
NE	100	MANLABS INC	MWRA DEER IS	500	0.0005	0.18	Y	7391	ISS	CAMBRIDGE	PHOTOGRAPHIC
NE	143	BAY ST DEVELOP	MWRA DEER IS	33660	0.0337	12.29	Y	3041	ISS	DORCHESTER	PLASTIC MOLD
NE	322	POLYMER TECH	MWRA DEER IS	4500	0.0045	1.64	N	2821	ISS	WILMINGTON	PLASTIC RES & SYNT
NE	49	EDIC	MWRA DEER IS	100	0.0001	0.04	Y	7521	ISS	BOSTON	-
NE	28	RAYTHEON CO	MWRA DEER IS	55145	0.0551	20.13	Y	3679	ISS	BEDFORD	EL & ELTRONIC COMP
NE	89	609 REALTY TR	MWRA POTW	2300	0.0023	0.84	Y	8211	PEN	BOSTON	-
					5.7956	2115.4					
NE	282	LOUIS SMITO &SO	MDC NUT ISL	25000	0.0250	9.13	N	4953	ISS	RANDOLPH	-
NE	88	NEW ENG DEACONES	MWRA NUT IS	2375	0.0024	0.87	Y	-	ISS	BOSTON	
NE	158	MASCESTER CO	MWRA NUT ISL	36400	0.0364	13.29	Y	-	ISS	GLOUCESTER	
NE	246	BURNS RELTY	MWRA NUT ISL	7000	0.0070	2.56	Y	-	ISS	MILTON	
NE	314	FOSTER BROS INC	MWRA NUT ISL	2000	0.0020	0.73	N	3271	ISS	WESTWOOD	CONSTRUCTION
NE	269	JET SPRAY CO	MWRA NUT ISL	52560	0.0526	19.18	Y	3685	PEN	NORWOOD	EL & ELTRONIC COMP
NE	76	TOWERMARC CORP	NUT ISL	8000	0.0080	2.92	N	2831	ISS	BOSTON	PHOTOGR CHEM
					0.1333	48.67					
SE	85	POLYMETALLURGICAL	N ATTLEBORO	70000	0.0700	25.55	Y	3398	PEN	N ATTLEBORO	NONFERROUS MET FORM
SE	98	POLYETALURGICAL	N ATTLEBORO	70000	0.0700	25.55	Y	3398	PEN	N ATTLEBORO	NONFERROUS MET FORM
SE	97	RILEY LUMBER CO	N ATTLEBORO	140000	0.1400	51.10	-	-	ISS	N ATTLEBORO	TIMBER PROD
SE	102	MINI-SYSTEMS	N ATTLEBORO	1800	0.0018	0.66	N	3679	ISS	PLAINVILLE	EL & ELTRONIC COMP
SE	101	GRAPHIC IMAGES	N ATTLEBORO	770	0.0008	0.28	N	-	PEN	PLAINVILLE	PRINT & PUBL
SE	120	SHELL OIL CO	N.ATTLEBORO	4300	0.0043	1.57	Y	-	PEN	PLAINVILLE	PETROLEUM
					0.2869	104.71					
SE	89	AQUATEC OF MASS	N BEDFORD	200	0.0002	0.07	N	7397	ISS	NEWBEDFORD	-
SE	3	MR FRED KELLEY	N BEDFORD	14400	0.0144	5.26	Y	5541	ISS	NEWBEDFORD	PETROLEUM SERV ST
SE	35	NE WBEDFORD	N BEDFORD PO	0	0.0000	0.00	Y	-	PEN	DARTMOUTH	
SE	94	EASTERN ENERG	N BEDFORD PO	142500	0.1425	52.01	Y	4961	ISS	NEWBEDFORD	-
SE	95	EASTERN ENERG	N BEDFORD PO	0	0.0000	0.00	Y	4961	ISS	NEWBEDFORD	-
SE	88	GOODYEAR TIRE	N BEDFORD PO	900000	0.9000	328.50	N	3069	PEN	NEW BEDFORD	PLASTIC MOLD
SE	91	RELIABLE HOMES	N BEDFORD WW	25000	0.0250	9.13	Y	3619	ISS	NEWBEDFORD	EL & ELTRONIC COMP
SE	34	THE ACUSHNET	N BEDFORD WW	27000	0.0270	9.86	N	3949	ISS	N BEDFORD WWT	ELECTROPL & METAL FIN
SE	92	CAMEO CURTAINS	N BEDFORD WW	0	0.0000	0.00	-	-	ISS	NEWBEDFORD	TEXTILE
SE	90	HARROB CORP	NEW BEDFORD	5000	0.0050	1.83	Y	-	ISS	NEWBEDFORD	
SE	93	ISOTRONICS	NEW BEDFORD	0	0.0000	0.00	-	3673	ISS	NEW BEDFORD	EL & ELTRONIC COMP
NE	239	MASS PROTEIN PRO	NEW BEDFORD	33500	0.0335	12.23	Y	-	ISS	N BEDFORD	
SE	47	J KARAM INC	NEW BEDFORD	9600	0.0096	3.50	N	7215	ISS	NEW BEDFORD	IND & COM LAUNDRY
SE	104	SPEEDEE OIL CHANGE	NEW BEDFORD	522	0.0005	0.19	N	-	ISS	NEW BEDFORD	PETROLEUM
SE	36	GOLDEN EYE SEAFOODS	NEWBEDFORD W	29000	0.0290	10.59	S	-	ISS	FAIRHAVEN	
					1.1867	433.15					
NE	259	BRUSH WELLMAN	NBRYPORT POT	19822	0.0198	7.24	Y	2819	PEN	NEWBURYPORT	INORG CHEM
NE	256	CITY OF NBURYPORT	NBURYPORT PO	30030	0.0300	10.96	Y	-	PEN	NEWBURYPORT	

NE	261	BIXBY INTERN'L CORP	NEWBURYPORT	1250	0.0013	0.46	Y	3079	ISS	NEWBURYPORT	PLASTIC MOLD
NE	257	CITY OF NBRYPORT	NEWBURYPORT	108000	0.1080	39.42	Y	-	PEN	NEWBURYPORT	
NE	263	M&V ELECTROPLT	NEWBURYPORT	0	0.0000	0.00	Y	3471	PEN	NEWBURYPORT	ELECTRO & MET FIN
NE	258	M&V ELEC	NEWBURYPORT	30000	0.0300	10.95	Y	3416	ISS	NEWBURYPORT	ELECTRO & MET FIN
NE	262	POLYORGANICS CP	NEWBURYPORT	2000	0.0020	0.73	N	2869	ISS	NEWBURYPORT	ORG CHEMIC
NE	243	COASTAL METAL FIN	NEWBURYPORT	48000	0.0480	17.52	-	3471	ISS	MERRIMAC	ELECTRO & MET FIN
NE	260	POLYONICS CORP	NEWBURYPORT	9500	0.0095	3.47	N	7391	ISS	NEWBURYPORT	-
					0.2486	90.74					
CEN	8	WHITE CON INDU	NORTHBRIDGE	1440	0.0014	0.53	Y	-	ISS	WHITINVILLE	
CEN	63	SMITH VALUE CORP	NORTHBRIDGE	1500	0.0015	0.55	Y	-	ISS	WHITINSVILLE	
CEN	11	KURT ANDERSON	NORTHBRIDGE	7458	0.0075	2.72	Y	3471	ISS	DOUGLAS	ELECTRO & MET FIN
CEN	44	RIVERDALE MILLS	NORTHBRIDGE	57600	0.0576	21.02	Y	3496	ISS	NORTHRIDGE	ELECTRO & MET FIN
					0.0680	24.82					
CEN	92	FL ROBERTS	NORTHHAMPTON	610104	0.6101	222.69	Y	7549	ISS	NORTHHAMPTON	-
WES	85	FL ROBERT& CO	NORTHHAMPTON	3664	0.0037	1.34	Y	7549	ISS	NORTHAMPTON	-
					0.6138	224.03					
WES	42	GETTY PETRDLEUM	PALMER POTW	144600	0.1446	52.78	Y	5541	ISS	PALMER	PETROLEUM SERV ST
WES	63	OMEGA PROCE	PALMER WP CO	23000	0.0230	8.40	Y	3471	ISS	MONSON	ELECTRO & MET FIN
WES	67	PALMER SANTUCCI	PALMER WPCF	9600	0.0096	3.50	N	-	ISS	PALMER	
					0.1772	64.68					
SE	105	JOHNSON WAX CO	PEPPERELL ST	25000	0.0250	9.13	-	-	ISS	RACINE	
CEN	88	JOHNSON WAX	PEPPERELL ST	25000	0.0250	9.13	Y	-	ISS	PEPPERELL	
					0.0500	0.00					
WES	7	JAMES A. COHEN	PITTSFIELD	20200	0.0202	7.37	Y	-	PEN	ALBANY	
WES	38	ALTRESCO PITTSFIELD	PITTSFIELD	561600	0.5616	204.98	Y	4931	ISS	PITTSFIELD	-
WES	71	BERKSHIRE HEALTH	PITTSFIELD P	11760	0.0118	4.29	N	-	ISS	PITTSFIELD	
WES	70	OMNI SER	PITTSFIELD S	64800	0.0648	23.65	N	7218	ISS	PITTSFIELD	IND & COM LAUNDRY
WES	69	GE PLLLLLASTICS FAC	PITTSFIELD W	100000	0.1000	36.50	Y	2821	ISS	PITTSFIELD	PLASTIC RES & SYNT
					0.7584	276.80					
SE	103	SUPERIOR PET PRODUCT	PLYMOUTH	18000	0.0180	6.57	-	3199	ISS	PLYMOUTH	LEATHER TANN & PROD
SE	96	NEW ENGLAND ART	ROCKLAND POT	3550	0.0036	1.30	Y	2771	PEN	NORTH ABINGTO	PRINT & PUBL
SE	106	VAPONICS INC	ROCKLAND WWT	2955	0.0030	1.08	Y	3589	ISS	ROCKLAND	EQPT MFG & ASSEMB
NE	71	BREAKWATER RLTY	ROCKLND WWTP	140	0.0001	0.05	Y	2752	ISS	ROCKLAND	PRINT & PUBL
					0.0066	2.43					
WES	37	OXFORD PICKLE COMP	S DEERFIELD	498500	0.4985	181.95	Y	2035	ISS	DEERFIELD	-
NE	117	BOSTON ENVELOPE	S ESSEX	310	0.0003	0.11	N	2648	ISS	CANTON	PULP & PAPER
NE	138	WARREN WHITE	S ESSEX SEW	600	0.0006	0.22	Y	-	ISS	DANVERS	
NE	311	GCR LANDFILL	S ESSEX SEW	14400	0.0144	5.26	N	4953	ISS	WELLESLEY	-
NE	136	FISHERY PROD	S ESSEX SEW	18000	0.0180	6.57	Y	2092	ISS	DANVERS	-
WES	49	O'CONNELL ENG	S ESSEX SEW	24270	0.0243	8.86	Y	4931	ISS	-	-
NE	155	VARIAN ASSOC	S ESSEX SEW	200	0.0002	0.07	Y	8211	ISS	GLOUCESTER	-
NE	273	LAKELAND PK	S ESSEX SEW	43200	0.0432	15.77	Y	4959	ISS	PEABODY	-
NE	274	JOHN H SEITES	S ESSEX SEW	50000	0.0500	18.25	N	4953	ISS	PEABODY	-
NE	287	SUNBURST FRUIT JU	S ESSEX SEW	5600	0.0056	2.04	Y	2086	ISS	SALEM	-
NE	35	NEW ENGLAND BO	S ESSEX SEW	2730	0.0027	1.00	Y	2899	ISS	BEVERLY	EXPLOSIVES
NE	295	SAVERIO CIR	S ESSEX SEW	12000	0.0120	4.38	N	7215	ISS	TOPSFIELD	IND & COM LAUNDRY
NE	135	JOSEPH A DEL	S ESSEX SEW	15250	0.0153	5.57	-	7215	ISS	DANVERS	IND & COM LAUNDRY
NE	288	ROMAR TECH	S ESSEX SEW	1100	0.0011	0.40	N	3339	ISS	SALEM	NONFERROUS MET MFG
NE	34	ROMAR TECH	S ESSEX SEW	1600	0.0016	0.58	N	3339	ISS	BEVERLY	NONFERROUS MET MFG
NE	137	ADVANCED PHOTO	S ESSEX SEW	1200	0.0012	0.44	Y	7395	ISS	DANVERS	PHOTOGRAPHIC
NE	252	COLOR SER	S ESSEX WW	3600	0.0036	1.31	Y	7384	ISS	NEEDHAM	PHOTOGRAPHIC
					0.1941	70.83					
WES	72	PRECISION LITHO	S HADLEY POT	63300	0.0633	23.10	Y	3555	ISS	SOUTH HADLEY	EQPT MFG & ASSEMB
WES	76	PRECISION LITHO	S HADLEY POT	111000	0.1110	40.52	Y	3555	ISS	SOUTH HADLEY	EQPT MFG & ASSEMB
WES	75	TEXON INC.	S HADLEY WWT	500000	0.5000	182.50	-	2621	ISS	SOUTH HADLEY	PULP & PAPER
					0.6743	246.12					
NE	289	HERTIAGE TRUST	SALEM	6800	0.0068	2.48	-	-	ISS	SALEM	
CEN	51	370 SHOEMKR	SOUTHBORO	480	0.0005	0.18	N	-	ISS	SOUTHBORO	

APPENDIX

CEN	53	SCHOTT FIBER OPTIC	SOUTHBRIDGE	39666	0.0397	14.48	Y	3826	ISS	SOUTHBRIDGE	EQPT MFG & ASSEMB
CEN	54	TOWN OF SPENCER	SPENCER POTW	6500	0.0065	2.37	N	-	PEN	SPENCER POTW	
					0.0534	19.51					
WES	58	CATAD CHEMICAL	SPRINGFIELD	30	0.0000	0.01	Y	2865	ISS	LONGMEADOW	DYE MFG & FOAM
WES	5	STANDARD UNIFORM	SPRINGFIELD	53000	0.0530	19.35	Y	7218	ISS	AGAWAM	IND & COM LAUNDRY
WES	2	DEP PUB WKS	SPRINGFIELD	1000000	1.0000	365.00	N	4225	ISS	SPRIINGFIELD	-
WES	127	FRIENDLY ICE	SPRINGFIELD	200000	0.2000	73.00	Y	5812	PEN	WILBRAHAM	-
SE	27	SHELL OIL CO.	SPRINGFIELD	50	0.0001	0.02	-	7542	ISS	SPRINGFIELD	PETROLEUM
WES	6	B&D PETR. CAR W	SPRINGFIELD	0	0.0000	0.00	-	-	PEN	AGAWAM	
WES	41	R.E.PHELON	SPRINGFIELD	1200	0.0012	0.44	N	-	ISS	E LONGMEADOW	
WES	10	MASSPOWER	SPRINGFIELD	411840	0.4118	150.32	Y	-	ISS	SPRINGFIELD	
WES	77	WAL BEN INDUS	SPRINGFIELD	2550	0.0026	0.93	N	-	ISS	SPRINGFIELD	
WES	78	CLAUDE D. LABRIE	SPRINGFIELD	10	0.0000	0.00	N	-	ISS	SPRINGFIELD	
WES	79	F.L. ROBERTS	SPRINGFIELD	3010	0.0030	1.10	N	7549	ISS	SPRINGFIELD	-
WES	107	STROMS FORGE	SPRINGFIELD	2300	0.0023	0.84	Y	3460	ISS	SPRINGFIELD	IRON & STEEL MFG
WES	84	STROMS FORGE	SPRINGFIELD	2500	0.0025	0.91	Y	3460	ISS	SPRINGFIELD	IRON & STEEL MFG
WES	92	MONSANTO CO	SPRINGFIELD	6000000	6.0000	2190.0	Y	2821	ISS	SPRINGFIELD	PLASTIC RES & SYNT
WES	113	MONSANTO CHEMICAL	SPRINGFIELD	0	0.0000	0.00	-	2821	PEN	SPRINGFIELD	PLASTIC RES & SYNT
WES	106	VALLEY PLAT	SPRINGFIELD	24000	0.0240	8.76	-	3471	ISS	SPRINGFIELD	ELECTRO & MET FIN
WES	99	POLYSAR INC	SPRINGFIELD	99720	0.0997	36.40	Y	2821	ISS	SPRINGFIELD	PLASTIC RES & SYNT
WES	9	CLAUDE&EVA BEAU	SPRINGFIELD	15000	0.0150	5.48	-	-	ISS	BELCHERTOWN	
WES	74	CATAD CHEMICAL	SPRINGFIELD	500	0.0005	0.18	-	-	ISS	LUDLOW	ORG CHE MFG
WES	39	MILTON BRADLEY CO	SPRINGFIELD	5206	0.0052	1.90	N	2499	ISS	E LONGMEADOW	TIMBER PROD
WES	34	UNITED TECH AUTO	SPRINGFLD PO	8000	0.0080	2.92	Y	-	PEN	DEARBORN	
WES	123	STATE LINE SNA	SPRINGFLD PO	65000	0.0650	23.73	Y	2099	ISS	WILBRAHAM	-
WES	56	AGRI-MARK INC	SPRINGFLD PO	105000	0.1050	38.33	Y	2021	ISS	SPRINGFIELD	-
WES	109	MOBIL OIL CORP	SPRINGFLD WW	900	0.0009	0.33	N	5171	ISS	SPRINGFIELD	PETROLEUM PROD
WES	112	MOBIL OIL	SPRINGFLD WW	1550	0.0016	0.57	N	5541	ISS	SPRINGFIELD	PETROLEUM SERV ST
WES	55	FLUOR RESOURCES	SPRINGFLD WW	17000	0.0170	6.21	N	4953	ISS	SPRINGFIELD	-
WES	104	ASA MANUF	SPRNGFLD WWT	200	0.0002	0.07	Y	-	ISS	SPRINGFIELD	
WES	110	MICHAEL BISC	SPRNGFLD WWT	5	0.0000	0.00	N	-	ISS	SPRINGFIELD	
WES	103	ASSOC BLD	SPRNGFLD WWT	500	0.0005	0.18	N	-	ISS	SPRINGFIELD	
WES	105	FL ROBERTS	SPRNGFLD WWT	5160	0.0052	1.88	Y	7549	ISS	SPRINGFIELD	-
WES	86	FL ROBERT& CO	SPRNGFLD WWT	2065	0.0021	0.75	Y	7549	ISS	SPRINGFIELD	-
WES	111	UNIFIRST	SPRNGFLD WWT	312000	0.3120	113.88	Y	7218	ISS	SPRINGFIELD	IND & COM LAUNDRY
WES	108	ASTRO CHEMICAL	SPRNGFLD WWT	85000	0.0850	31.03	Y	-	PEN	SPRINGFIELD	INORG CHEM
CEN	97	SHELL OIL CO	SPRNGFLD WWT	50	0.0001	0.02	Y	7542	ISS	W SPRINGFIELD	PETROLEUM
					8.4233	3074.5					
CEN	89	GALILED ELEC	STRUBRIDGE	13000	0.0130	4.75	Y	3832	ISS	STURBRIDGE	EQPT MFG & ASSEMB
WES	114	GALILED ELECTRO	STRUBRIDGE W	13000	0.0130	4.75	Y	3832	ISS	STURBRIDGE	EQPT MFG & ASSEMB
CEN	85	ARCO	STURBRIDGE W	0	0.0000	0.00	Y	5544	ISS	STRURBRIDGE	PETROLEUM SERV ST
SE	71	ARCO	STURBRIDGE W	0	0.0000	0.00	Y	5544	ISS	STURBRIDGE	PETROLEUM SERV ST
					0.0260	9.49					
SE	87	PRESTON MANCHESTER	SUFSIDE FILT	1500	0.0015	0.55	Y	-	ISS	NANTUCKET	
SE	86	LINDA K. REZENDES	SURFSIDE POT	300	0.0003	0.11	N	-	ISS	NANTUCKET	
					0.0018	0.66					
WES	116	ALL STATES ASPH	SUNDERLND	2200	0.0022	0.80	Y	5032	ISS	SUNDERLND	-
SE	114	DARY RING TRAVELER	TAUNTON	4000	0.0040	1.46	-	-	ISS	TAUNTON	
SE	110	HARODITE FINISH	TAUNTON MUNI	432000	0.4320	157.68	Y	2261	ISS	TAUNTON	TEXTILE MILLS
SE	115	FEDERAL EXPRESS	TAUNTON POTW	5900	0.0059	2.15	N	4111	ISS	TAUNTON	-
SE	116	USA DEVELOP	TAUNTON POTW	10590	0.0106	3.87	N	5531	ISS	TAUNTON	-
NE	91	JOHNSON ORTH	TAUNTON WPCF	5400	0.0054	1.97	N	3842	ISS	RAYNHAM	EQPT MFG & ASSEMB
SE	100	PRINCESS HOUSE	TAUNTON WW	400	0.0004	0.15	N	5023	ISS	NORTH DIHGTON	-
SE	112	REED&BARTON CORP	TAUNTON WWPC	55000	0.0550	20.08	Y	3914	ISS	TAUNTON	ELECTROPL & METAL FIN
NE	312	ATRIUM ASSOC	TAUNTON WWTF	20	0.0000	0.01	N	-	ISS	RAYNHAM	
SE	111	ROYCE ALUMINUM	TAUNTON WWTF	13562	0.0136	4.95	N	3341	ISS	TAUNTON	NONFERROUS MET MFG
SE	26	B&J MANUF	TAUNTON WWTP	2000	0.0020	0.73	Y	3471	ISS	TAUNTON	ELECTRO & MET FIN
SE	99	ROSEMAR SILVER	TAUNTON WWTP	10500	0.0105	3.83	Y	3914	ISS	NORTH DIHGTON	ELECTROPL & METAL FIN
CEN	39	WATERS ASSOC	TAUNTON WWTF	8200	0.0082	2.99	-	2899	ISS	MILFORD	EXPLOSIVES

					0.5476	199.86					
CEN	6	BALDWINVILLE PROD	TEMPLETON WW	2310000	2.3100	843.15	N	2621	ISS	BALDWINVILLE	PULP & PAPER
WES	117	ESLEECK MANUF	TURNERS FALL	0	0.0000	0.00	-	2621	PEN	TURNERS FALLS	PULP & PAPER
					2.3100	843.15					
CEN	66	AMERICAN LINEN	UP BLKSTNE	40100	0.0401	14.64	Y	7213	ISS	WORCESTER	IND & COM LAUNDRY
CEN	70	GARREPY PLAT	UP BLKSTONE	10300	0.0103	3.76	Y	3471	PEN	WORCESTER	ELECTRO & MET FIN
CEN	18	REED ROLL THR	UP BLKSTONE	72000	0.0720	26.28	Y	3545	ISS	HOLDEN	EQPT MFG & ASSEMB
CEN	17	REED PLASTICS	UP BLKSTONE	15000	0.0150	5.48	N	3087	ISS	HOLDEN	PLASTIC MOLD
CEN	3	AUTOMATIC ROLL	UPP BLACKSTO	203	0.0002	0.07	N	2051	ISS	AUBURN	-
NE	152	EXXON CO	UPP BLKSTN	100	0.0001	0.04	Y	7542	ISS	EVERETT	PETROLEUM
CEN	64	WORCESTER BUSINESS	UPP BLKSTNE	250000	0.2500	91.25	Y	-	ISS	WORCESTER	
CEN	68	DRESSER INDUS	UPP BLKSTNE	4320	0.0043	1.58	-	3541	ISS	WORCESTER	EQPT MFG & ASSEMB
CEN	19	ECC COPR	UPP BLKSTNE	100000	0.1000	36.50	-	3679	ISS	HOLDEN	EL & ELTRONIC COMP
CEN	16	SIGNAL ENVI	UPP BLKSTONE	303408	0.3034	110.74	N	4953	ISS	HAMPTON	-
					0.7954	290.33					
CEN	55	STANLEY WOOLEN COMP	UXBRIDGE SEW	400000	0.4000	146.00	-	2231	ISS	UXBRIDGE	TEXTILE MILLS
WES	118	WARE COGEN LTD	WARE WWTP	48000	0.0480	17.52	N	4911	ISS	WARE	-
WES	119	B&B QUAL DYE	WARE WWTP	100000	0.1000	36.50	N	2269	ISS	WARE	TEXTILE MILLS
					0.1480	54.02					
SE	30	SOFT TOUCH CAR	WAREHAM POTW	8105	0.0081	2.96	Y	7542	ISS	WAREHAM	-
SE	119	OUI-LOK CORP	WAREHAM STP	0	0.0000	0.00	-	-	ISS	WAREHAM	
					0.0081	2.96					
CEN	56	HARDWICKKNIT	WARREN WWTP	350000	0.3500	127.75	Y	2300	ISS	WARREN	TEXTILE MILLS
CEN	57	OLEKTRON CORP	WEBSTER	5250	0.0053	1.92	N	3679	ISS	WEBSTER	EL & ELTRONIC COMP
CEN	46	GOLDSTEIN &GURWITZ	WEBSTER	4000	0.0040	1.46	-	-	ISS	OXFORD	
					0.0093	3.38					
CEN	86	SCRUBADUB CARWASH	WESTBORO	15556	0.0156	5.68	Y	-	ISS	SHREWSBURY	
CEN	49	TOWN SHREWSBURY	WESTBORO POT	0	0.0000	0.00	Y	-	ISS	SHREWSBURY	
NE	118	CUMBERLAND FA	WESTBORO POT	33120	0.0331	12.09	Y	2051	PEN	CANTON	-
CEN	58	ASTRA PHARM	WESTBORO POT	200000	0.2000	73.00	Y	2834	PEN	WESTBORO	PHOTOGR CHEM
NE	250	SCRUBADUB CARWASH	WESTBORO WWT	15556	0.0156	5.68	Y	-	ISS	NATICK	
CEN	52	DATA GENERAL CORP	WESTBORO WWT	1556	0.0016	0.57	-	3679	ISS	SOUTHBORO	EL & ELTRONIC COMP
NE	74	INVESTER TRUST	WESTBOROUGH	1275	0.0013	0.47	Y	7397	ISS	WESTBORO	-
NE	73	INVESTER TRUST	WESTBOROUGH	1275	0.0013	0.47	Y	7397	ISS	WESTBORO	-
CEN	59	126 TURNPIKE RD	WESTBORO/SHR	7800	0.0078	2.85	Y	-	ISS	WESTBORO	
CEN	48	DIGITAL EQUIP	WESTBR/SHREW	65000	0.0650	23.73	Y	3572	ISS	SHREWSBURY	EQPT MFG & ASSEMB
					0.3411	124.52					
NE	70	HI-TECH REAL	WESTERLY TMN	4200	0.0042	1.53	Y	5045	ISS	BOSTON	-
CEN	28	TECOMET-ETC	WESTERLY TRT	4600	0.0046	1.68	Y	3479	ISS	MARLBORO	ELECTRO & MET FIN
CEN	47	CEDAR HILL RTLY	WESTERLY WWT	500	0.0005	0.18	Y	-	ISS	MARLBORO	
CEN	29	PALLAS PHOTO LA	WESTERLY WWT	9600	0.0096	3.50	Y	7395	ISS	MARLBORO	PHOTOGRAPHIC
					0.0189	6.90					
WES	121	BERSHIRE INDUS	WESTFIELD	4175	0.0042	1.52	Y	3599	ISS	WESTFIELD	EQPT MFG & ASSEMB
WES	52	AMAPAD CORP	WESTFIELD	8750	0.0088	3.19	N	3563	ISS	WESTFIEELD	EQPT MFG & ASSEMB
WES	120	TEXON USA	WESTFIELD	500	0.0005	0.18	N	2649	ISS	WESTFIELD	PULP & PAPER
NE	315	SHELL OIL CO	WESTWOOD	50	0.0001	0.02	-	-	ISS	WESTWOOD	PETROLEUM
					0.0135	4.92					
WES	126	UTILITY MANF	WILBRAHAM WW	4000	0.0040	1.46	-	3316	ISS	WILBRAHAM	IRON & STEEL
CEN	14	N ENG WOODEN WARE	WINCHENDON S	162	0.0002	0.06	N	4212	ISS	WINCHENDON	-
CEN	67	FRANK BELSITO	WORCESTER	300	0.0003	0.11	N	-	ISS	WORCESTER	
					0.0045	1.6286					
			TOTAL	45158327	45.1583	16483					

APPENDIX TABLE B.1-2

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          MUNICIPAL SOLID WASTE LANDFILLS 1990
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TOWN      COUNTY     ID       SITE_NAME           SITE ADDRESS      TUS
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ABINGTON  PLYMOUTHSL0001.003 ABINGTON LANDFILL   GROVELAND ST      C
ACTON     MIDDLESESL0002.003 ACTON LANDFILL      14 FOREST RD/RTE 2I
ACUSHNET  BRISTOL SL0003.001 B AND F - BFI LANDFI561 N MAIN ST     I
ADAMS     BERKSHIRSL0004.001 ADAMS LANDFILL      EAST RD           A
AGAWAM    HAMPDEN SL0005.001 AGAWAM LANDFILL-BONDWORCESTER ST (BONDA
AMESBURY  ESSEX   SL0007.001 SCA LANDFILL        SCA - HUNT RD     I
AMESBURY  ESSEX   SL0007.004 AMESBURY LANDFILL   RTE 150/ST JOSEPHSI
AMHERST   HAMPSHIRSL0008.002 AMHERST LANDFILL    BELCHERTOWN RD/RTEA
ARLINGTON MIDDLESESL0010.001 ARLINGTON LANDFILL  KEATS RD          I
ARLINGTON MIDDLESESL0010.002 ARLINGTON LANDFILL  DRAELON RD        I
ARLINGTON MIDDLESESL0010.003 ARLINGTON LANDFILL  SUMMER ST/REED RD I
ARLINGTON MIDDLESESL0010.004 ARLINGTON LANDFILL  CONCORD TPK       I
ASHBURNHAMWORCESTESL0011.002 ASHBURNHAM LANDFILL RTE 12, P.O. BOX 4A
ASHBURNHAMWORCESTESL0011.003 ASHBURNHAM LANDFILL CORREY HILL       I
ASHBY     MIDDLESESL0012.002 ASHBY LANDFILL      GREENVILLE RD/RTE A
ASHBY     MIDDLESESL0012.004 ASHBY LANDFILL      WHEELER RD        I
ATHOL     WORCESTESL0015.001 ATHOL LANDFILL      WEST BOYLSTON RD  A
ATTLEBORO BRISTOL SL0016.001 ATTLEBORO LANDFILL  179 PECKHAM ST    A
AUBURN    WORCESTESL0017.001 AUBURN LANDFILL     ROCHDALE ST (ST SWC
AUBURN    WORCESTESL0017.002 AUBURN LANDFILL     STAFFORD ST/MILLBUI
AYER      MIDDLESESL0019.001 AYER LANDFILL       GROTON-HARVARD ROAI
AYER      MIDDLESESL0019.004 AYER LANDFILL       FT DEVENS         I
BARNSTABLEBARNSTABSL0020.001 BARNSTABLE LANDFILL FLINT ST/OLD BARNSA
BARRE     WORCESTESL0021.001 BARRE LANDFILL      SUMMER ST/NICHOL RI
BARRE     WORCESTESL0021.002 RESOURCE CONTROL INCVALLEY ROAD/WORCESA
BECKET    BERKSHIRSL0022.001 BECKET LANDFILL     RTE 8             I
BELCHERTOWHAMPSHIRSL0024.001 BELCHERTOWN LANDFILLHAMILTON ST       A
BELLINGHAMNORFOLK SL0025.002 BELLINGHAM LANDFILL MAPLE ST          I
BELLINGHAMNORFOLK SL0025.003 BELLINGHAM LANDFILL CENTRE ST/E OF POUI
BELMONT   MIDDLESESL0026.001 BFI LANDFILL        1150 CONCORD AVE  I
BERKLEY   BRISTOL SL0027.001 CAL'S DUMP - SCA LANOLD COUNTY RD     I
BERKLEY   BRISTOL SL0027.004 BERKLEY LANDFILL    BRYANT RD/BRIAN STI
BERLIN    WORCESTESL0028.001 HUDSON LANDFILL     GATES POND RD     I
BERLIN    WORCESTESL0028.002 BERLIN LANDFILL     JONES RD          I
BERNARDSTOFRANKLINSL0029.001 BERNARDSTON LANDFILLCEDAR LN/PARMENTERA
BEVERLY   ESSEX   SL0030.004 BEVERLY LANDFILL    BRIMBAL AVE       I
BILLERICA MIDDLESESL0031.006 SHAFFER LANDFILL    POND ST           I
BLACKSTONEWORCESTESL0032.001 BLACKSTONE LANDFILL CHESTNUT ST       A
BLACKSTONEWORCESTESL0032.002 BLACKSTONE LANDFILL FARM ST           I
BOLTON    WORCESTESL0034.001 BOLTON LANDFILL     FORBUSH MILL RD   A
BOLTON    WORCESTESL0034.002 BOLTON LANDFILL     114 OLD BAY RD (GRI
BOSTON    SUFFOLK SL0035.005 BOSTON LANDFILL     GARDNER ST        I
BOURNE    BARNSTABSL0036.003 OTIS AIRFORCE BASE LCONNERY RD        C
BOURNE    BARNSTABSL0036.004 BOURNE LANDFILL     MACARTHUR BLVD/RTEA
BOURNE    BARNSTABSL0036.004 BOURNE LANDFILL     MACARTHUR BLVD/RTEA
BOXBOROUGHMIDDLESESL0037.001 BOXBOROUGH LANDFILL CODMAN HILL RD    I
BOXFORD   ESSEX   SL0038.001 BOXFORD LANDFILL    SPOFFORD ROAD     A
BOYLSTON  WORCESTESL0039.001 BOYLSTON LANDFILL   MILE HILL RD      C
BOYLSTON  WORCESTESL0039.002 BOYLSTON LANDFILL   OLD SOUTH RD      I
BRAINTREE NORFOLK SL0040.003 BRAINTREE LANDFILL  IVORY ST (MBTA STAC
BREWSTER  BARNSTABSL0041.001 BREWSTER LANDFILL   RUN HILL RD       A
BRIDGEWATEPLYMOUTHSL0042.004 CHUCKRAN CORPORATIONBEDFORD/COLONIAL DA
BRIMFIELD HAMPDEN SL0043.002 BRIMFILED LANDFILL  DUG HILL RD       I
BROCKTON  PLYMOUTHSL0044.001 BROCKTON LANDFILL   WEST CHESTNUT ST  I
BROOKLINE NORFOLK SL0046.001 BROOKLINE LANDFILL  815 NEWTON ST     I
BROOKLINE NORFOLK SL0046.002 BROOKLINE LANDFILL  HAMMOND ST        I
BUCKLAND  FRANKLINSL0047.001 BUCKLAND LANDFILL   HODGAN RD/RTE 112/A
BURLINGTONMIDDLESESL0048.002 BURLINGTON LANDFILL MULLER RD         I
CAMBRIDGE MIDDLESESL0049.003 CAMBRIDGE LANDFILL  NEW ST            C
CANTON    NORFOLK SL0050.001 CANTON LANDFILL     PINE ST           C
CARVER    PLYMOUTHSL0052.004 CARVER-MARION-WAREHAFEDERAL ST (DISTRIA
CHARLEMONTFRANKLINSL0053.001 CHARLEMONT LANDFILL RTE 8A/WARNER HILLI
CHARLTON  WORCESTESL0054.002 CHARLTON LANDFILL   FLINT RD          A
CHATHAM   BARNSTABSL0055.001 CHATHAM LANDFILL    SAM RYDER RD/MAIN A
CHELMSFORDMIDDLESESL0056.002 CHEMSFORD LANDFILL  SWAIN RD          C
CHELSEA   SUFFOLK SL0057.002 CHELSEA LANDFILL    WEBSTER ST        I
CHESHIRE  BERKSHIRSL0058.001 CHESHIRE LANDFILL   NOTCH RD          I
CHICOPEE  HAMPDEN SL0061.001 BFI - AHEARN LANDFIL845 BURNETT RD    A
CHICOPEE  HAMPDEN SL0061.002 PARTYKA LANDFILL    LOMBARD RD        A
CHILMARK  DUKES   SL0062.001 CHILMARK LANDFILL   TABOR HOUSE RD    A
CLARKSBURGHAMPSHIRSL0063.001 CLARKSBURG LANDFILL WEST ST           A
CLINTON   WORCESTESL0064.001 CLINTON LANDFILL    SOUTH MEADOW RD   C
COHASSET  NORFOLK SL0065.001 COHASSET LANDFILL   CEDAR ST          I
COLRAIN   FRANKLINSL0066.001 COLRAIN LANDFILL    RTE 112           I
COLRAIN   FRANKLINSL0066.004 COLRAIN LANDFILL    AMOUNT RD/RTE 112 A
CONCORD   MIDDLESESL0067.001 CONCORD LANDFILL    RTE 2/RTE 126/WALDA
DANVERS   ESSEX   SL0071.002 DANVERS LANDFILL    POPES LANE/EAST COI
DANVERS   ESSEX   SL0071.003 DANVERS LANDFILL    ANDOVER ST        I
DARTMOUTH BRISTOL SL0072.004 DARTMOUTH LANDFILL  759 RUSSELL MILLS A
DEDHAM    NORFOLK SL0073.002 DEDHAM LANDFILL     WASHINGTON ST     I
DEERFIELD FRANKLINSL0074.001 DEERFIELD LANDFILL  LEE RD            A
DENNIS    BARNSTABSL0075.001 DENNIS LANDFILL     RTE 134/THEO SMITHA
DIGHTON   BRISTOL SL0076.001 DIGHTON LANDFILL    TREMONT ST        A
DIGHTON   BRISTOL SL0076.002 DIGHTON LANDFILL    SOMERSET AVE      I
DOVER     NORFOLK SL0078.001 DOVER LANDFILL      POWISETT ST       I
DUDLEY    WORCESTESL0080.001 DUDLEY LANDFILL     INDIAN RD         A
DUNSTABLE MIDDLESESL0081.001 DUNSTABLE LANDFILL  DEPOT ST          C
DUXBURY   PLYMOUTHSL0082.001 DUXBURY LANDFILL    TREMONT ST        I
EAST BRIDGPLYMOUTHSL0083.001 EAST BRIDGEWATER LANBRIDGE ST/PLAIN STA
EAST BRIDGPLYMOUTHSL0083.003 NORTHERN DISPOSAL IN234 THATCHER ST (BA
EAST BROOKWORCESTESL0084.001 EAST BROOKFIELD LANDCONNIE MACK RD    I
EAST LONGMHAMPDEN SL0085.001 KNOWLTON DISPOSAL LATINA LANE         I
EASTHAM   BARNSTABSL0086.001 EASTHAM LANDFILL    ORCHARD STREET    A
EASTHAMPTOHAMPSHIRSL0087.001 EASTHAMPTON LANDFILLOLIVER-ST         A
EASTHAMPTOHAMPSHIRSL0087.003 EASTHAMPTON LANDFILLLOUDVILLE RD      I
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EASTHAMPTOHAMPSHIRSL0087.003 EASTHAMPTON LANDFILLLOUDVILLE RD      I
EASTON    BRISTOL SL0088.001 EASTON LANDFILL     PROSPECT ST       A
EASTON    BRISTOL SL0088.007 EASTON LANDFILL     BAY RD/KINSLEY RD/I
EDGARTOWN DUKES   SL0089.003 EDGARTOWN LANDFILL  CLEVELAND TOWN RD A
EGREMONT  BERKSHIRSL0090.001 EGREMONT LANDFILL   PHILLIPS RD/BALDWII
ESSEX     ESSEX   SL0092.001 ESSEX LANDFILL      LANDING RD        I
EVERETT   MIDDLESESL0093.001 EVERETT LANDFILL    AVCO CENTER       I
FAIRHAVEN BRISTOL SL0094.001 FAIRHAVEN LANDFILL  BRIDGE ST         A
FALL RIVERBRISTOL SL0095.001 FALL RIVER LANDFILL (OLD DUMP)        I
FALL RIVERBRISTOL SL0095.002 FALL RIVER INC LANDF1080 AIRPORT ROAD A
FALMOUTH  BARNSTABSL0096.001 FALMOUTH LANDFILL   THOMAS LANDERS RD A
FITCHBURG WORCESTESL0097.004 FITCHBURG LANDFILL  FALULAH RD        I
FOXBOROUGHNORFOLK SL0099.001 FOXBOROUGH LANDFILL EAST BELCHER RD   A
FRAMINGHAMMIDDLESESL0100.002 FRAMINGHAM LANDFILL MILLWOOD ST       I
FREETOWN  BRISTOL SL0102.003 FREETOWN LANDFILL   WEST HOWLAND RD   A
GARDNER   WORCESTESL0103.002 GARDNER LANDFILL    WEST ST/RTE 68    A
GAY HEAD  DUKES   SL0104.001 GAY HEAD LANDFILL   SOUTH RD/LOBSTRUL I
GLOUCESTERESSEX   SL0107.001 GLOUCESTER LANDFILL WESTERN AVE       I
GOSHEN    HAMPSHIRSL0108.001 GOSHEN LANDFILL     WING HILL RD      I
GOSNOLD   DUKES   SL0109.001 GOSNOLD LANDFILL    CUTTYHUNK ISLAND  I
GOSNOLD   DUKES   SL0109.002 GOSNOLD LANDFILL                      A
GRAFTON   WORCESTESL0110.001 GRAFTON LANDFILL    CROSBY ST         I
GRANBY    HAMPSHIRSL0111.001 PARTYKA LANDFILL - GNEW LUDLOW RD/RTE A
GRANVILLE HAMPDEN SL0112.001 GRANVILLE LANDFILL  WATER ST          I
GREAT BARRBERKSHIRSL0113.002 GREAT BARRINGTON LANRTE 7/STOCKBRIDGE A
GREENFIELDFRANKLINSL0114.001 GREENFIELD LANDFILL WISDOM WAY        A
GROTON    MIDDLESESL0115.001 GROTON LANDFILL     FLAVELL ST/RTE 40 C
HALIFAX   PLYMOUTHSL0118.003 BFI - HALIFAX LANDFI27 LAUREL ST      A
HAMILTON  ESSEX   SL0119.001 HAMILTON LANDFILL   CHEBACCO RD       I
HAMPDEN   HAMPDEN SL0120.002 HAMPTON LANDFILL    CROSS STREET      A
HARDWICK  WORCESTESL0124.001 HARDWICK LANDFILL   PATRILL HOLLOW RD A
HARVARD   WORCESTESL0125.001 HARVARD LANDFILL    DEPOT RD          I
HARWICH   BARNSTABSL0126.001 HARWICH LANDFILL    QUEEN ANN RD/FLAX A
HAVERHILL ESSEX   SL0128.003 HAVERHILL LANDFILL  NECK ROAD/WARD HILA
HEATH     FRANKLINSL0130.001 HEATH LANDFILL      BARRINGTON RD     I
HINGHAM   PLYMOUTHSL0131.001 HINGHAM LANDFILL    HOBART ST         A
HOLBROOK  NORFOLK SL0133.001 HOLBROOK LANDFILL   PHILIPS RD        I
HOLBROOK  NORFOLK SL0133.002 HOLBROOK LANDFILL   MAPLE RD (REAR)   A
HOLDEN    WORCESTESL0134.001 HOLDEN LANDFILL     RIVER ST          C
HOLDEN    WORCESTESL0134.002 HOLDEN LANDFILL     NORTH OF PILGRIMS I
HOLLAND   HAMPDEN SL0135.001 HOLLAND LANDFILL    STURBRIDGE RD     A
HOLLISTON MIDDLESESL0136.001 HOLLISTON LANDFILL  UNION ST          I
HOPEDALE  WORCESTESL0138.001 MJ MURPHY LANDFILL  S MAIN ST/RTE 140 C
HOPEDALE  WORCESTESL0138.003 DRAPER LANDFILL                       I
HOPKINTON MIDDLESESL0139.001 E.L. HARVEY - RITTERRTE 135           C
HUBBARDSTOWORCESTESL0140.001 HUBBARDSTON LANDFILLNEW TEMPLETON RD  C
HUBBARDSTOWORCESTESL0140.002 HUBBARDSTON LANDFILLWILLIAMSVILLE RD  I
HUBBARDSTOWORCESTESL0140.003 HUBBARDSTON LANDFILLWORCESTER RD      I
HUDSON    MIDDLESESL0141.001 MELONE HUDSON/STOW LCOX ST/OLD STOW RDI
HUDSON    MIDDLESESL0141.002 RESOURCE CONTROL INCCEMETERY RD/OLD STA
HULL      PLYMOUTHSL0142.002 HULL LANDFILL       LOGAN AVE         A
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HULL	PLYMOUTH	SL0142.002	HULL LANDFILL	LOGAN AVE	A
HUNTINGTON	HAMPDEN	SL0143.001	HUNTINGTON LANDFILL	BASKET STREET	I
KINGSTON	PLYMOUTH	SL0145.001	KINGSTON LANDFILL	SMITH LN/CRANBERRY	A
LAKEVILLE	PLYMOUTH	SL0146.001	LAKEVILLE LANDFILL	RTE 97/RHODE IS RD	A
LANCASTER	PLYMOUTH	SL0147.001	LANCASTER LANDFILL	LUNENBURG RD	A
LANCASTER	PLYMOUTH	SL0147.002	LANCASTER LANDFILL	MILL ST	I
LAWRENCE	ESSEX	SL0149.001	LAWRENCE LANDFILL	RTE 495/INTER 46	I
LEE	BERKSHIR	SL0150.001	LEE LANDFILL	WILLOW HILL ST	C
LEE	BERKSHIR	SL0150.006	MEAD PAPER SLUDGE LA	RTE 102/LAURAL MIL	A
LEE	BERKSHIR	SL0150.007	KIMBERLY CLARK SLUDG	WILLOW HILL RD (SL	A
LEICESTER	WORCESTE	SL0151.001	LEICESTER LANDFILL	151 MANVILLE RD	A
LEICESTER	WORCESTE	SL0151.002	LEICESTER LANDFILL	CHAPEL ST	I
LEOMINSTER	WORCESTE	SL0153.003	LEOMINSTER LANDFILL	MECHANIC ST	I
LEVERETT	FRANKLIN	SL0154.001	LEVERTT LANDFILL	CUSHMAN RD/CEMETAR	A
LINCOLN	MIDDLESE	SL0157.001	LINCOLN LANDFILL	LANDFILL RD/N GREA	C
LITTLETON	MIDDLESE	SL0158.001	LITTLETON LANDFILL	SPECTACLE POND ROA	C
LONGMEADOW	HAMPDEN	SL0159.002	LONGMEADOW LANDFILL	TINA LN	A
LOWELL	MIDDLESE	SL0160.001	LOWELL LANDFILL	WESTFORD ST/STEDMA	A
LUDLOW	HAMPDEN	SL0161.002	LUDLOW LANDFILL	HOLYOKE STREET	A
LUNENBURG	WORCESTE	SL0162.001	LUNENBURG LANDFILL	YOUNGS RD	A
LYNN	ESSEX	SL0163.001	LYNN LANDFILL	250 COMMERCIAL ST	I
LYNN	ESSEX	SL0163.002	D'RAZIO LANDFILL	HOLYOKE ST/OCALLAH	I
LYNN	ESSEX	SL0163.003	GENERAL ELECTRIC LAN	RTE 107	I
MANCHESTER	ESSEX	SL0166.001	MANCESTER LANDFILL	PINE ST	I
MANSFIELD	BRISTOL	SL0167.001	MANSFIELD LANDFILL	EAST ST/RTE 106	I
MARION	PLYMOUTH	SL0169.001	MARION LANDFILL	BENSON BK	A
MARLBOROUG	MIDDLESE	SL0170.001	MARLBOROUGH LANDFILL	BOLTON ST/RTE 85	C
MARSHFIELD	PLYMOUTH	SL0171.004	MARSHFIELD LANDFILL	CLAY PIT RD/GROVE	A
MARSHFIELD	PLYMOUTH	SL0171.007	MARSHFIELD LANDFILL	BRANT ROCK	I
MASHPEE	BARNSTAB	SL0172.001	MASHPEE LANDFILL	ASHERS PATH	A
MATTAPOISE	PLYMOUTH	SL0173.001	MATTAPOISETT LANDFIL	RAILROAD AVE/NORTH	I
MATTAPOISE	PLYMOUTH	SL0173.002	MATTAPOISETT LANDFIL	TINKHAM HILL	I
MATTAPOISE	PLYMOUTH	SL0173.003	MATTAPOISETT LANDFIL	NORTH ST/TINKHAM H	A
MAYNARD	MIDDLESE	SL0174.001	MAYNARD LANDFILL	WALTHAM ST/POWDER	C
MEDFIELD	NORFOLK	SL0175.001	MEDFIELD LANDFILL	N. MEADOWS RD/ RT.	A
MEDWAY	NORFOLK	SL0177.002	MEDWAY LANDFILL	HIGHLAND ST	I
MEDWAY	NORFOLK	SL0177.003	MEDWAY LANDFILL	BROAD ST EXTENSION	I
MENDON	WORCESTE	SL0179.001	MENDON LANDFILL	BELLINGHAM RD	I
MERRIMAC	ESSEX	SL0180.003	MERRIMAC LANDFILL	BATTIS RD	A
MERRIMAC	ESSEX	SL0180.005		BROAD ST/NORTH ST	I
METHUEN	ESSEX	SL0181.001	METHUEN LANDFILL	HUNTINGTON AVE	C
MIDDLEBORO	PLYMOUTH	SL0182.002	MIDDLEBOROUGH LANDFI	BROOK ST	A
MIDDLEFIEL	HAMPSHIR	SL0183.003	MIDDLEFIELD LANDFILL	SKYLINE TRAIL	I
MIDDLETON	ESSEX	SL0184.002	MIDDLETON LANDFILL	RIVER ST/DOVER ST	A
MIDDLETON	ESSEX	SL0184.003	RUBCHINUK LANDFILL	EAST ST	I
MILFORD	WORCESTE	SL0185.001	MILFORD LANDFILL	CEDAR ST	I
MILLBURY	WORCESTE	SL0186.001	MILLBURY LANDFILL	RIVERLIN RD	I
MILLIS	NORFOLK	SL0187.001	MILLIS LANDFILL	ISLAND ST	C
MILTON	NORFOLK	SL0189.001	MILTON (ACE) LANDFIL	750 RANDOLPH AVE/R	A
MONSON	HAMPDEN	SL0191.002	MONSON LANDFILL	RTE 32/WOOD RIDGE	I
MONTAGUE	FRANKLIN	SL0192.001	MONTAGUE LANDFILL	TURNPIKE RD	A

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MONTAGUE  FRANKLINSL0192.001 MONTAGUE LANDFILL   TURNPIKE RD       A
MONTEREY  BERKSHIRSL0193.001 MONTEREY LANDFILL   GOULD RD          C
NANTUCKET NANTUCKESL0197.001 NANTUCKET LANDFILL  MADAKET RD        A
NATICK    MIDDLESESL0198.001 NATICK LANDFILL     WEST ST           A
NEEDHAM   NORFOLK SL0199.001 NEEDHAM LANDFILL    1407 CENTRAL AVE/RA
NEW ASHFORBERKSHIRSL0200.001 NEW ASHLAND LANDFILLINGRAHAM RD       I
NEW BEDFORBRISTOL SL0201.001 NEW BEDFORD LANDFILL1103 SHAWMUT AVE  A
NEW BEDFORBRISTOL SL0201.003 NEW BEDFORD LANDFILLCHURCH ST         A
NEW BEDFORBRISTOL SL0201.004 NEW BEDFORD LANDFILLLIBERTY ST        I
NEWBURY   ESSEX   SL0205.002 NEWBURY LANDFILL    BOSTON/MAY ST     A
NEWBURYPORESSEX   SL0206.001 NEWBURYPORT LANDFILLCROW LANE         I
NEWTON    MIDDLESESL0207.001 NEWTON LANDFILL     ELLIOT ST - DPW YAI
NEWTON    MIDDLESESL0207.003 NEWTON LANDFILL     LEXINGTON/RIVER STI
NEWTON    MIDDLESESL0207.005 NEWTON LANDFILL     121 RUMFORD AVE.  I
NORFOLK   NORFOLK SL0208.001 NORFOLK LANDFILL    MEDWAY RD         A
NORTH ADAMBERKSHIRSL0209.003 NORTH ADAMS LANDFILLAVENUE E/D STREET A
NORTH ATTLBRISTOL SL0211.001 NORTH ATTLEBOROUGH LMOUNT HOPE RD     A
NORTH BROOWORCESTESL0212.001 NORTH BROOKFIELD LANEAST BROOKFIELD RDA
NORTH BROOWORCESTESL0212.003 NORTH BROOKFIELD LANBRADSHAW ST       I
NORTH BROOWORCESTESL0212.004 NORTH BROOKFIELD LANNEW BRAINTREE RD  I
NORTH READMIDDLESESL0213.001 NORTH READING LANDFIPARK ST           I
NORTHAMPTOHAMPSHIRSL0214.001 NORTHAMPTON LANDFILLGLENDALE RD       A
NORTHBOROUWORCESTESL0215.002 NORTHBOROUGH LANDFILBOUNDARY ST/CHURCHI
NORTHBRIDGWORCESTESL0216.001 NORTHBRIDGE LANDFILL1201 QUAKER ST (LEC
NORTON    BRISTOL SL0218.002 NORTON LANDFILL     HILL ST           C
NORWELL   PLYMOUTHSL0219.003 NORWELL LANDFILL    MT HOPE ST        I
NORWOOD   NORFOLK SL0220.002 NORWOOD LANDFILL    CEMETERY ST/OFF WII
OAK BLUFFSDUKES   SL0221.001 OAK BLUFF LANDFILL  COUNTY RD/PENN AVEA
OAKHAM    WORCESTESL0222.001 OAKHAM LANDFILL     SOUTH RD          C
ORANGE    FRANKLINSL0223.003 ORANGE LANDFILL     JONES ST          A
ORLEANS   BARNSTABSL0224.001 ORLEANS LANDFILL    LOTS HOLLOW RD    A
OXFORD    WORCESTESL0226.002 OXFORD LANDFILL     FEDERAL HILL RD   C
PALMER    HAMPDEN SL0227.001 PALMER LANDFILL     AIRPORT RD/EMERY SA
PAXTON    WORCESTESL0228.002 PAXTON LANDFILL     DAVIS HILL RD     I
PEABODY   ESSEX   SL0229.001 GCR LANDFILL        DEARBORN RD/RTE 1/A
PEMBROKE  PLYMOUTHSL0231.001 PEMBROKE LANDFILL   HOBOMOCK ST       A
PEPPERELL MIDDLESESL0232.001 PEPPERELL LANDFILL  BOYNTON ST        A
PLAINVILLENORFOLK SL0238.002 LAIDLAW LANDFILL    BELCHER/RTE 1-495 A
PLYMOUTH  PLYMOUTHSL0239.001 MAMOMET LANDFILL    BEAVER DAM RD     A
PLYMOUTH  PLYMOUTHSL0239.003 PLYMOUTH CEDARVILLE HEDGES POND/RTE 3 C
PRINCETON WORCESTESL0241.001 PRINCETON LANDFILL  RTE 140/RTE 62    I
PRINCETON WORCESTESL0241.002 PRINCETON LANDFILL  HUBBARDSTON RD    C
PROVINCETOBARNSTABSL0242.002 PROVINCETOWN LANDFILRACE POINT RD/BENNA
QUINCY    NORFOLK SL0243.001 BFI QUINCY LANDFILL WILLARD ST/RICCIUTI
RANDOLPH  NORFOLK SL0244.001 BFI RANDOLPH LANDFILJOHNSON ST        A
RAYNHAM   BRISTOL SL0245.001 RAYNHAM LANDFILL    KING PHILLIP ST   A
RAYNHAM   BRISTOL SL0245.003 RAYNHAM LANDFILL    THRASHER RD/E BRITI
REHOBOTH  BRISTOL SL0247.003 REHOBOTH LANDFILL   PLAIN STREET      A
RICHMOND  BERKSHIRSL0249.001 RICHMOND LANDFILL   CONE HILL RD      I
ROCHESTER PLYMOUTHSL0250.001 ROCHESTER LANDFILL  HIGH ST           A
ROCKLAND  PLYMOUTHSL0251.001 ROCKLAND LANDFILL   BEECH ST          A
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ROCKLAND	PLYMOUTH	SL0251.001	ROCKLAND LANDFILL	BEECH ST	A
ROCKLAND	PLYMOUTH	SL0251.002	WALEN BROTHERS LANDF	BEECH ST/RYE HILL	I
ROCKPORT	ESSEX	SL0252.002	ROCKPORT LANDFILL	RTE 127/MAIN ST	I
ROWLEY	ESSEX	SL0254.003	ROWLEY LANDFILL	OLD ROWLEY RD	A
ROYALSTON	WORCESTE	SL0255.001	ROYALSTON LANDFILL	TOWN DUMP RD	A
RUTLAND	WORCESTE	SL0257.001	RUTLAND LANDFILL	POMMOQUSSETT RD	I
RUTLAND	WORCESTE	SL0257.002	RUTLAND LANDFILL	CHARNOCK HILL RD	C
SALEM	ESSEX	SL0258.001	SALEM'S OLD INCINERA	SWAMPSCOTT RD	I
SALISBURY	ESSEX	SL0259.001	SALISBURY LANDFILL	OLD COUNTY RD	A
SANDWICH	BARNSTAB	SL0261.002	SANDWICH LANDFILL	#85 RTE 130/RTE 6	C
SAUGUS	ESSEX	SL0262.002	SAUGUS LANDFILL	MAIN ST	I
SAUGUS	ESSEX	SL0262.004	DEWEY DAGGETT LANDFI	RTE 107/100 SALEM	I
SAVOY	BERKSHIR	SL0263.001	SAVOY LANDFILL	CHAPEL RD	I
SCITUATE	PLYMOUTH	SL0264.001	SCITUATE LANDFILL	161 DRIFTWAY RD	A
SEEKONK	BRISTOL	SL0265.001	SEEKONK LANDFILL	FALL RIVER RD	A
SHARON	NORFOLK	SL0266.001	SHARON LANDFILL	MOUNTAIN ST	C
SHEFFIELD	BERKSHIR	SL0267.002	SHEFFIELD LANDFILL	UPPER BARNUM ST	C
SHERBORN	MIDDLESE	SL0269.001	SHERBORN LANDFILL	MAIN ST/RTE 27	I
SHIRLEY	MIDDLESE	SL0270.001	SHIRLEY LANDFILL	SHIRLEY RD (GRAVEL	A
SHREWSBURY	WORCESTE	SL0271.001	SHREWSBURY LANDFILL	RTE 20	C
SOMERSET	BRISTOL	SL0273.001	SOMERSET LANDFILL	BRAYTON POINT RD	I
SOUTH HADL	HAMPSHIR	SL0275.001	SOUTH HADLEY LANDFIL	INDUSTRIAL DRIVE	A
SOUTHAMPTO	HAMPSHIR	SL0276.001	SOUTHAMPTON LANDFILL	MOOSE BROOK RD	A
SOUTHBOROU	WORCESTE	SL0277.002	UNCONFIRMED SITE	PARKERVILLE RD	I
SOUTHBOROU	WORCESTE	SL0277.003	SOUTHBOROUGH LANDFIL	SCHOOL ST	I
SOUTHBRIDG	WORCESTE	SL0278.001	SOUTHBRIDGE LANDFILL	GUELPH HILL RD	I
SOUTHBRIDG	WORCESTE	SL0278.002	SOUTHBRIDGE LANDFILL	BAREFOOT FARM RD	A
SOUTHBRIDG	WORCESTE	SL0278.003	SOUTHBRIDGE LANDFILL	TORRY RD	I
SOUTHWICK	HAMPDEN	SL0279.002	SOUTHWICK LANDFILL	SAM WEST RD	I
SPRINGFIEL	HAMPDEN	SL0281.003	SPRINGFIELD LANDFILL	COTTAGE ST/TURNBUL	I
STERLING	WORCESTE	SL0282.001	STERLING LANDFILL	RTE 12 JUNCTION/CH	C
STOCKBRIDG	BERKSHIR	SL0283.003	STOCKBRIDGE LANDFILL	RTE 102	I
STONEHAM	MIDDLESE	SL0284.001	STONEHAM LANDFILL	HALL RD/BROOKBRIDG	I
STONEHAM	MIDDLESE	SL0284.002	STONEHAM LANDFILL	DALE ST/GAREY ST	I
STOUGHTON	NORFOLK	SL0285.001	STOUGHTON LANDFILL	PAGE ST	I
STOW	MIDDLESE	SL0286.002	STOW LANDFILL	HARVARD RD	I
STURBRIDGE	WORCESTE	SL0287.001	STURBRIDGE LANDFILL	BREAKNECK RD	A
STURBRIDGE	WORCESTE	SL0287.005	STURBRIDGE LANDFILL	CEDAR ST	I
SUDBURY	MIDDLESE	SL0288.001	SAND HILL LANDFILL	490 BOSTON POST RD	A
SUDBURY	MIDDLESE	SL0288.003	SUDBURY LANDFILL	RT 117	I
SUNDERLAND	FRANKLIN	SL0289.003	SUNDERLAND LANDFILL	RESERVATION ROAD	A
SUTTON	WORCESTE	SL0290.002	SUTTON LANDFILL	OLD STONE SCHOOL R	A
SWAMPSCOTT	ESSEX	SL0291.002	SWAMPSCOTT LANDFILL	PHILLIPS PARK	I
TAUNTON	BRISTOL	SL0293.002	TAUNTON LANDFILL	330 E. BRITANNIA S	A
TEMPLETON	WORCESTE	SL0294.001	TEMPLETON LANDFILL	RTE 2/2A	I
TEMPLETON	WORCESTE	SL0294.002	TEMPLETON LANDFILL	BARRE RD/RTE 101	I
TEMPLETON	WORCESTE	SL0294.003	TEMPLETON LANDFILL	RTE 202	A
TEWKSBURY	MIDDLESE	SL0295.001	ROCCO LANDFILL	SOUTH ST	I
TEWKSBURY	MIDDLESE	SL0295.002	TEWKSBURY LANDFILL	MARTHA AVE	I
TISBURY	DUKES	SL0296.002	TISBURY LANDFILL	VINEYARD HAVEN RD/	A
TOPSFIELD	ESSEX	SL0298.002	TOPSFIELD LANDFILL	124 HAVERHILL/BARE	A

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TOPSFIELD ESSEX    SL0298.002 TOPSFIELD LANDFILL  124 HAVERHILL/BAREA
TOWNSEND  MIDDLESESL0299.002 TOWNSEND LANDFILL   TURNPIKE RD        A
TRURO     BARNSTABSL0300.001 TRURO LANDFILL      RTE 6/DEERFIELD STC
TYNGSBOROUMIDDLESESL0301.001 CHARLIE GEORGE RECLADUNSTABLE RD       C
UXBRIDGE  WORCESTESL0304.001 UXBRIDGE LANDFILL   HAZEL ST           C
WALPOLE   NORFOLK SL0307.005 BIRD AND SONS LANDFINORFOLK ST/WASHINGI
WALTHAM   MIDDLESESL0308.001 WALTHAM LANDFILL    COVEST/NORUMBEGA TI
WALTHAM   MIDDLESESL0308.002 WALTHAM LANDFILL    LYMAN ST           I
WARE      HAMPSHIRSL0309.001 WARE LANDFILL       ROBBINS RD         A
WAREHAM   PLYMOUTHSL0310.001 WAREHAM LANDFILL    CHARGE POND RD/RTEI
WARREN    WORCESTESL0311.001 WARREN LANDFILL     BRIMFIELD RD/SOUTHA
WARWICK   FRANKLINSL0312.001 WARWICK LANDFILL    GARAGE RD/OFF WINCA
WASHINGTONBERKSHIRSL0313.001 WASHINGTON LANDFILL FROST RD/RTE 8     I
WATERTOWN MIDDLESESL0314.002 WATERTOWN LANDFILL  HIGHLAND AVE/ONLEYI
WATERTOWN MIDDLESESL0314.003 WATERTOWN LANDFILL  PLEASANT ST        I
WAYLAND   MIDDLESESL0315.004 SAND HILL LANDFILL  RTE 20             A
WEBSTER   WORCESTESL0316.001 WEBSTER LANDFILL    CUDWORTH RD        C
WELLESLEY NORFOLK SL0317.001 WELLESLEY LANDFILL  169 GREAT PLAIN STI
WELLFLEET BARNSTABSL0318.001 WELLFLEET LANDFILL  COLES NECK RD/BONDA
WEST BOYLSWORCESTESL0321.001 WEST BOYLSTON LANDFIRTE 140/35 WORCESTI
WEST BRIDGPLYMOUTHSL0322.001 WEST BRIDGEWATER LANELM/S ELM ST       I
WEST BROOKWORCESTESL0323.001 WEST BROOKFIELD LANDWIGMWAM RD         A
WEST NEWBUESSEX    SL0324.001 STEELE LANDFILL     MIDDLE ST/GEORGETOC
WEST TISBUDUKES    SL0327.001 WEST TISBURY LANDFILVINEYARD HAVEN RD/A
WESTBOROUGWORCESTESL0328.001 WESTBOROUGH LANDFILLHOPKINTON RD/RTE 1A
WESTFIELD HAMPDEN SL0329.001 WESTFIELD LANDFILL  TWISS ST           A
WESTFIELD HAMPDEN SL0329.002 WESTFIELD LANDFILL  LOCKHOUSE RD       I
WESTFORD  MIDDLESESL0330.001 WESTFORD LANDFILL   COLD SPRING RD     C
WESTHAMPTOHAMPSHIRSL0331.001 WESTHAMPTON LANDFILLHATHAWAY RD        A
WESTMINSTEWORCESTESL0332.001 FITCHBERG-WESTMINSTERTE 31/PRINCETON RA
WESTON    MIDDLESESL0333.001 WESTON LANDFILL     OFF CHURCH ST      I
WESTPORT  BRISTOL SL0334.002 WESTPORT LANDFILL   HICKSBRIDGE RD     A
WEYMOUTH  NORFOLK SL0336.003 WEYMOUTH LANDFILL   WHARF ST/WEYMOUTH I
WHITMAN   PLYMOUTHSL0338.001 WHITMAN LANDFILL    ESSEX ST           C
WILBRAHAM HAMPDEN SL0339.001 WILBRAHAM LANDFILL  RAILROAD AVE-CORNEA
WILBRAHAM HAMPDEN SL0339.002 WILBRAHAM LANDFILL  RAILROAD AVE-EAST I
WILLIAMSTOBERKSHIRSL0341.006 WILLIAMSTOWN LANDFILWILLIAMS COLLEGE  I
WILMINGTONMIDDLESESL0342.003 WILMINGTON LANDFILL BALLARDVALE RD     I
WINCHENDONWORCESTESL0343.001 WINCHENDOM LANDFILL RIVER ST           A
WINDSOR   BERKSHIRSL0345.002 WINDSOR LANDFILL    RTE 9              I
WOBURN    MIDDLESESL0347.001 WOBURN LANDFILL     MERRIMAC ST/NEW BOI
WORCESTER WORCESTESL0348.004 WORCESTER LANDFILL  GREENWOOD ST       C
WORTHINGTOHAMPSHIRSL0349.001 WORTHINGTON LANDFILLDINGLE RD          I
YARMOUTH  BARNSTABSL0351.003 YARMOUTH LANDFILL   RTE 6/MID CAPE HWYI
YARMOUTH  BARNSTABSL0351.005 YARMOUTH LANDFILL   600 FOREST ROAD   A
WILLIAMSTOBERKSHIRSL0341.008 WILLIAMSTOWN LANDFILSIMONDS ROAD       A
CHICOPEE  HAMPDEN SL0061.006 M.T. SULLIVAN LANDFIOFF BURNETT ROAD (I
DOUGLAS   WORCESTESL0077.005 DOUGLAS LANDFILL    RIEDELL ROAD       C
SPENCER   WORCESTESL0280.005 SPENCER LANDFILL    SOUTH SPENCER ROADC
CHESTERFIEHAMPSHIRSL0060.002 CHESTERFIELD LANDFILWILLCUT ROAD       I
MALDEN    MIDDLESESL0165.004 MALDEN LANDFILL     MAPLEWOOD STREET  I
MALDEN     MIDDLESESL0165.004 MALDEN LANDFILL     MAPLEWOOD STREET  I
HOLYOKE    HAMPDEN SL0137.006 PARTYKA LANDFILL INCNEW LUDLOW ROAD   C
NEW MARLBOBERKSHIRSL0203.003 NEW MARLBOROUGH WOODSOUTH SANDISFIELD C
SAUGUS     ESSEX   SL0262.007 GENERAL ELECTRIC LANROUTE 107         C
HADLEY     HAMPSHIRSL0117.003 HADLEY MUNICIPAL LANNORTH BRANCH GREATI
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APPENDIX

TABLE B.1-3

LANDFILL NMOC EMISSIONS 1990

ef1:Abington-Montague

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
TOWN	COUNTY	ID	EST OPEN BASE	ACTUAL OPEN BASE	CLOSE BASE	CURREN YEAR	TOTAL REFUS TONS'90	NMOC TONS 1990	LFIL AGE	EST CLOSE YR TPY	LTPY 1985	LTPY 1986	LTPY 1987	LTPY 1988	LTPY 1989	LTPY 1990	REFUSE 64-84	84 TT	83 TT	82 TT	81 TT	80 TT	79 TT	78 TT	77 TT	76 TT
ABINGTON	PLYMOUTH	SL0001.003	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ACTON	MIDDLESEX	SL0002.003	1962	0	1988	1988	214406	7.58	26		12500	12500	12500	12500	0	0	164406	12	11	11	10	10	9	9	9	8
ACUSHNET	BRISTOL	SL0003.001	1961	0	1987	1987	1372958	48.55	26		85000	85000	85000	0	0	0	1117958	81	78	74	71	68	64	62	59	56
ADAMS	BERKSHIRE	SL0004.001	1966	1966	1993	1990	234829	8.30	27		12000	13000	13000	13000	13000	13000	157829	11	11	10	10	10	9	9	8	8
AGAWAM	HAMPDEN	SL0005.001	1972	0	1998	1990	1892524	66.92	26		100000	100000	117000	117000	117000	26280	1315244	96	91	87	83	79	76	72	69	66
AMESBURY	ESSEX	SL0007.001	1951	0	1977	1977	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
AMESBURY	ESSEX	SL0007.004	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
AMHERST	HAMPSHIRE	SL0008.002	1976	1976	2001	1990	375849	13.29	25		20000	20000	18200	18200	18200	18200	263049	19	18	17	17	16	15	14	14	13
ARLINGTON	MIDDLESEX	SL0010.001	1943	0	1969	1969	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ARLINGTON	MIDDLESEX	SL0010.002	1933	0	1959	1959	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ARLINGTON	MIDDLESEX	SL0010.003	1961	0	1987	1987	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ARLINGTON	MIDDLESEX	SL0010.004	1921	0	1947	1947	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ASHBURNHAM	WORCESTER	SL0011.002	1971	1971	1992	1990	49356	1.75	21		2500	2500	2500	2500	2500	3975	32881	2	2	2	2	2	2	2	2	2
ASHBURNHAM	WORCESTER	SL0011.003	1951	0	1977	1977	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ASHBY	MIDDLESEX	SL0012.002	1973	1973	1991	1990	105338	3.72	18		5500	5500	5500	5500	5500	5500	72338	5	5	5	5	4	4	4	4	4
ASHBY	MIDDLESEX	SL0012.004	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ATHOL	WORCESTER	SL0015.001	1959	1959	1993	1990	143643	5.08	34		7500	7500	7500	7500	7500	7500	98643	7	7	7	6	6	6	5	5	5
ATTLEBORO	BRISTOL	SL0016.001	1967	0	1993	1990	1562953	55.27	26		75000	109000	109000	109000	109000	65520	986433	72	68	65	62	60	57	54	52	50
AUBURN	WORCESTER	SL0017.001	1964	0	1990	1990	274439	9.70	26		16000	16000	16000	16000	0	0	210439	15	15	14	13	13	12	12	11	11
AUBURN	WORCESTER	SL0017.002	1924	0	1950	1950	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
AYER	MIDDLESEX	SL0019.001	1962	0	1988	1988	68610	2.43	26		4000	4000	4000	4000	0	0	52610	4	4	3	3	3	3	3	3	3
AYER	MIDDLESEX	SL0019.004	1963	0	1989	1989	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BARNSTABLE	BARNSTABLE	SL0020.001	1973	1973	1996	1990	766098	27.09	23		40000	40000	40000	40000	40000	40000	526098	38	36	35	33	32	30	29	28	26
BARRE	WORCESTER	SL0021.001	1904	0	1930	1930	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BARRE	WORCESTER	SL0021.002	1973	1973	1993	1990	377143	13.34	20		15500	15500	15500	15500	55640	55640	203863	15	14	14	13	12	12	11	11	10
BECKET	BERKSHIRE	SL0022.001	1942	0	1968	1968	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BELCHERTOW	HAMPSHIRE	SL0024.001	1968	0	1994	1990	95362	3.37	26		5000	5000	4200	4200	4200	7000	65762	5	5	4	4	4	4	4	3	3
BELLINGHAM	NORFOLK	SL0025.002	1964	0	1990	1990	155828	5.51	26		8580	8600	8600	8600	8600	0	112848	8	8	7	7	7	7	6	6	6
BELLINGHAM	NORFOLK	SL0025.003	1947	0	1973	1973	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BELMONT	MIDDLESEX	SL0026.001	1948	0	1974	1974	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BERKLEY	BRISTOL	SL0027.001	1946	0	1972	1972	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BERKLEY	BRISTOL	SL0027.004	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BERLIN	WORCESTER	SL0028.001	1958	0	1984	1984	21229	0.75	26		1500	0	0	0	0	0	19729	1	1	1	1	1	1	1	1	1
BERLIN	WORCESTER	SL0028.002	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BERNARDSTO	FRANKLIN	SL0029.001	1955	1955	1992	1990	18352	0.65	37		1000	1000	800	800	800	800	13152	1	1	1	1	1	1	1	1	1
BEVERLY	ESSEX	SL0030.004	1960	0	1986	1986	500031	17.68	26		33000	33000	0	0	0	0	434031	32	30	29	27	26	25	24	23	22
BILLERICA	MIDDLESEX	SL0031.006	1961	0	1987	1987	4727562	167.17	26		312000	312000	0	0	0	0	4103562	298	285	272	260	248	237	226	216	206
BLACKSTONE	WORCESTER	SL0032.001	1972	1972	1996	1990	86186	3.05	24		4500	4500	4500	4500	4500	4500	59186	4	4	4	4	4	3	3	3	3
BLACKSTONE	WORCESTER	SL0032.002	1947	0	1973	1973	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BOLTON	WORCESTER	SL0034.001	1968	1968	1998	1990	30644	1.08	30		1600	1600	1600	1600	1600	1600	21044	2	1	1	1	1	1	1	1	1
BOLTON	WORCESTER	SL0034.002	1945	0	1971	1971	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BOSTON	SUFFOLK	SL0035.005	1960	0	1986	1986	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BOURNE	BARNSTABLE	SL0036.003	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7

APPENDIX

BOURNE	BARNSTABLE	SL0036.003	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BOURNE	BARNSTABLE	SL0036.004	1968	1968	2000	1990	281210	9.94	32		14500	14500	14500	14500	14500	18000	190710	14	13	13	12	12	11	11	10	10
BOXBOROUGH	MIDDLESEX	SL0037.001	1960	0	1986	1986	30305	1.07	26		2000	2000	0	0	0	0	26305	2	2	2	2	2	2	1	1	1
BOXFORD	ESSEX	SL0038.001	1944	1944	1994	1990	105338	3.72	50		5500	5500	5500	5500	5500	5500	72338	5	5	5	5	4	4	4	4	4
BOYLSTON	WORCESTER	SL0039.001	1970	1970	1991	1990	63534	2.25	21		3500	3500	3500	3500	3500	0	46034	3	3	3	3	3	3	3	2	2
BOYLSTON	WORCESTER	SL0039.002	1926	0	1952	1952	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BRAINTREE	NORFOLK	SL0040.003	1960	0	1986	1986	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BREWSTER	BARNSTABLE	SL0041.001	1982	0	2008	1990	124491	4.40	26		6500	6500	6500	6500	6500	6500	85491	6	6	6	5	5	5	5	4	4
BRIDGEWATE	PLYMOUTH	SL0042.004	1964	0	1990	1990	174872	6.18	26		9000	9500	9500	9500	9500	9500	118372	9	8	8	7	7	7	7	6	6
BRIMFIELD	HAMPDEN	SL0043.002	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BROCKTON	PLYMOUTH	SL0044.001	1942	0	1968	1968	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BROOKLINE	NORFOLK	SL0046.001	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BROOKLINE	NORFOLK	SL0046.002	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
BUCKLAND	FRANKLIN	SL0047.001	1968	0	1994	1990	20352	0.72	26		1000	1000	1300	1300	1300	1300	13152	1	1	1	1	1	1	1	1	1
BURLINGTON	MIDDLESEX	SL0048.002	1932	0	1958	1958	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
CAMBRIDGE	MIDDLESEX	SL0049.003	1946	0	1972	1972	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
CANTON	NORFOLK	SL0050.001	1963	0	1989	1989	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
CARVER	PLYMOUTH	SL0052.004	1980	0	2006	1990	494449	17.48	26		20000	20000	20000	20000	20000	131400	263049	19	18	17	17	16	15	14	14	13
CHARLEMONT	FRANKLIN	SL0053.001	1946	0	1972	1972	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
CHARLTON	WORCESTER	SL0054.002	1977	1977	2001	1990	76610	2.71	24		4000	4000	4000	4000	4000	4000	52610	4	4	3	3	3	3	3	3	3
CHATHAM	BARNSTABLE	SL0055.001	1977	1977	1995	1990	118745	4.20	18		6200	6200	6200	6200	6200	6200	81545	6	6	5	5	5	5	4	4	4
CHELMSFORD	MIDDLESEX	SL0056.002	1963	0	1989	1989	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
CHELSEA	SUFFOLK	SL0057.002	1930	0	1956	1956	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
CHESHIRE	BERKSHIRE	SL0058.001	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
CHICOPEE	HAMPDEN	SL0061.001	1966	0	1992	1990	2634770	93.17	26		130000	130000	130000	189952	172500	172500	1709818	124	119	113	108	103	99	94	90	86
CHICOPEE	HAMPDEN	SL0061.002	1967	1967	2011	1990	3547808	125.45	44		208000	218100	26000	120000	120000	120000	2735708	199	190	181	173	165	158	151	144	137
CHILMARK	DUKES	SL0062.001	1950	1950	1995	1990	14939	0.53	45		780	780	780	780	780	780	10259	1	1	1	1	1	1	1	1	1
CLARKSBURG	HAMPSHIRE	SL0063.001	1967	0	1993	1990	28729	1.02	26		1500	1500	1500	1500	1500	1500	19729	1	1	1	1	1	1	1	1	1
CLINTON	WORCESTER	SL0064.001	1962	0	1988	1988	137820	4.87	26		8000	8200	8200	8200	0	0	105220	8	7	7	7	6	6	6	6	5
COHASSET	NORFOLK	SL0065.001	1970	1970	1990	1990	149389	5.28	20		7800	7800	7800	7800	7800	7800	102589	7	7	7	6	6	6	6	5	5
COLRAIN	FRANKLIN	SL0066.001	1964	0	1990	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
COLRAIN	FRANKLIN	SL0066.004	1968	0	1994	1990	27929	0.99	26		1500	1500	1300	1300	1300	1300	19729	1	1	1	1	1	1	1	1	1
CONCORD	MIDDLESEX	SL0067.001	1981	1981	1992	1990	464659	16.43	11		24000	25000	25000	25000	25000	25000	315659	23	22	21	20	19	18	17	17	16
DANVERS	ESSEX	SL0071.002	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
DANVERS	ESSEX	SL0071.003	1941	0	1967	1967	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
DARTMOUTH	BRISTOL	SL0072.004	1966	0	1992	1990	386549	13.67	26		20000	20700	20700	20700	20700	20700	263049	19	18	17	17	16	15	14	14	13
DEDHAM	NORFOLK	SL0073.002	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
DEERFIELD	FRANKLIN	SL0074.001	1967	0	1993	1990	61107	2.16	26		3000	3050	3900	3900	3900	3900	39457	3	3	3	2	2	2	2	2	2
DENNIS	BARNSTABLE	SL0075.001	1957	1957	1998	1990	268134	9.48	41		14000	14000	14000	14000	14000	14000	184134	13	13	12	12	11	11	10	10	9
DIGHTON	BRISTOL	SL0076.001	1969	0	1995	1990	38305	1.35	26		2000	2000	2000	2000	2000	2000	26305	2	2	2	2	2	2	1	1	1
DIGHTON	BRISTOL	SL0076.002	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
DOVER	NORFOLK	SL0078.001	1962	0	1988	1988	60034	2.12	26		3500	3500	3500	3500	0	0	46034	3	3	3	3	3	3	3	2	2
DUDLEY	WORCESTER	SL0080.001	1980	0	2006	1990	141728	5.01	26		7400	7400	7400	7400	7400	7400	97328	7	7	6	6	6	6	5	5	5
DUNSTABLE	MIDDLESEX	SL0081.001	1960	1960	1991	1990	19152	0.68	31		1000	1000	1000	1000	1000	1000	13152	1	1	1	1	1	1	1	1	1
DUXBURY	PLYMOUTH	SL0082.001	1951	0	1977	1977	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
EAST BRIDG	PLYMOUTH	SL0083.001	1969	0	1995	1990	191524	6.77	26		10000	10000	10000	10000	10000	10000	131524	10	9	9	8	8	8	7	7	7
EAST BRIDG	PLYMOUTH	SL0083.003	1978	1978	1995	1990	2516215	88.97	17		83000	83000	237250	365312	328000	328000	1091653	79	76	72	69	66	63	60	57	55
EAST BROOK	WORCESTER	SL0084.001	1962	0	1988	1988	20583	0.73	26		1200	1200	1200	1200	0	0	15783	1	1	1	1	1	1	1	1	1
EAST LONGM	HAMPDEN	SL0085.001	1948	0	1974	1974	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
EASTHAM	BARNSTABLE	SL0086.001	1967	0	1993	1990	182877	6.47	26	11000	0	0	6800	6800	6800	6800	144677	11	10	10	9	9	8	8	8	7
EASTHAMPTO	HAMPSHIRE	SL0087.001	1966	0	1992	1990	294439	10.41	26		16000	16000	13000	13000	13000	13000	210439	15	15	14	13	13	12	12	11	11

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EASTHAMPTO	HAMPSHIRE	SL0087.001	1966	0	1992	1990	294439	10.41	26		16000	16000	13000	13000	13000	13000	210439	15	15	14	13	13	12	12	11	11
EASTHAMPTO	HAMPSHIRE	SL0087.003	1943	0	1969	1969	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
EASTON	BRISTOL	SL0088.001	1970	0	1996	1990	162796	5.76	26		8500	8500	8500	8500	8500	8500	111796	8	8	7	7	7	6	6	6	6
EASTON	BRISTOL	SL0088.007	1946	0	1972	1972	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
EDGARTOWN	DUKES	SL0089.003	1967	0	1993	1990	51981	1.84	26		2500	2500	2500	4550	4550	2500	32881	2	2	2	2	2	2	2	2	2
EGREMONT	BERKSHIRE	SL0090.001	1962	0	1988	1988	34305	1.21	26		2000	2000	2000	2000	0	0	26305	2	2	2	2	2	2	1	1	1
ESSEX	ESSEX	SL0092.001	1959	0	1985	1985	16983	0.60	26		1200	0	0	0	0	0	15783	1	1	1	1	1	1	1	1	1
EVERETT	MIDDLESEX	SL0093.001	1937	0	1963	1963	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
FAIRHAVEN	BRISTOL	SL0094.001	1972	1972	2011	1990	306439	10.84	39		16000	16000	16000	16000	16000	16000	210439	15	15	14	13	13	12	12	11	11
FALL RIVER	BRISTOL	SL0095.001	1942	0	1968	1968	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
FALL RIVER	BRISTOL	SL0095.002	1938	1938	1997	1990	4447918	157.28	59		170000	178000	547500	415303	450600	450600	2235915	162	155	148	141	135	129	123	118	112
FALMOUTH	BARNSTABLE	SL0096.001	1974	1974	2001	1990	545845	19.30	27		28500	28500	28500	28500	28500	28500	374845	27	26	25	24	23	22	21	20	19
FITCHBURG	WORCESTER	SL0097.004	1945	0	1971	1971	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
FOXBOROUGH	NORFOLK	SL0099.001	1974	1974	2001	1990	153220	5.42	27		8000	8000	8000	8000	8000	8000	105220	8	7	7	7	6	6	6	6	5
FRAMINGHAM	MIDDLESEX	SL0100.002	1942	0	1968	1968	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
FREETOWN	BRISTOL	SL0102.003	1969	0	1995	1990	111415	3.94	26		6000	6000	6000	6000	6000	2500	78915	6	5	5	5	5	5	4	4	4
GARDNER	WORCESTER	SL0103.002	1967	0	1993	1990	222253	7.86	26		11500	11900	11900	11900	11900	11900	151253	11	10	10	10	9	9	8	8	8
GAY HEAD	DUKES	SL0104.001	1963	0	1989	1989	5146	0.18	26		300	300	300	300	0	0	3946	0	0	0	0	0	0	0	0	0
GLOUCESTER	ESSEX	SL0107.001	1962	0	1988	1988	548878	19.41	26		32000	32000	32000	32000	0	0	420878	31	29	28	27	25	24	23	22	21
GOSHEN	HAMPSHIRE	SL0108.001	1964	0	1990	1990	7661	0.27	26		400	400	400	400	400	400	5261	0	0	0	0	0	0	0	0	0
GOSNOLD	DUKES	SL0109.001	1961	0	1987	1987	646	0.02	26		40	40	40	0	0	0	526	0	0	0	0	0	0	0	0	0
GOSNOLD	DUKES	SL0109.002	1964	0	1990	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
GRAFTON	WORCESTER	SL0110.001	1961	0	1987	1987	137296	4.85	26		8500	8500	8500	0	0	0	111796	8	8	7	7	7	6	6	6	6
GRANBY	HAMPSHIRE	SL0111.001	1960	1960	1994	1990	1893244	66.95	34		100000	100000	78000	100000	100000	100000	1315244	96	91	87	83	79	76	72	69	66
GRANVILLE	HAMPDEN	SL0112.001	1964	0	1990	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
GREAT BARR	BERKSHIRE	SL0113.002	1975	1975	1993	1990	215677	7.63	18		11000	12000	12000	12000	12000	12000	144677	11	10	10	9	9	8	8	8	7
GREENFIELD	FRANKLIN	SL0114.001	1970	1970	1994	1990	284432	10.06	24		15300	15900	13000	13000	13000	13000	201232	15	14	13	13	12	12	11	11	10
GROTON	MIDDLESEX	SL0115.001	1974	1974	1990	1990	114915	4.06	16		6000	6000	6000	6000	6000	6000	78915	6	5	5	5	5	5	4	4	4
HALIFAX	PLYMOUTH	SL0118.003	1979	1979	1992	1990	2946726	104.20	13		130000	130000	547000	143308	143300	143300	1709818	124	119	113	108	103	99	94	90	86
HAMILTON	ESSEX	SL0119.001	1958	0	1984	1984	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
HAMPDEN	HAMPDEN	SL0120.002	1968	0	1994	1990	50657	1.79	26		3000	3000	2600	2600	0	0	39457	3	3	3	2	2	2	2	2	2
HARDWICK	WORCESTER	SL0124.001	1967	1967	1992	1990	38305	1.35	25		2000	2000	2000	2000	2000	2000	26305	2	2	2	2	2	2	1	1	1
HARVARD	WORCESTER	SL0125.001	1958	0	1984	1984	106143	3.75	26		7500	0	0	0	0	0	98643	7	7	7	6	6	6	5	5	5
HARWICH	BARNSTABLE	SL0126.001	1967	1967	2003	1990	162796	5.76	36		8500	8500	8500	8500	8500	8500	111796	8	8	7	7	7	6	6	6	6
HAVERHILL	ESSEX	SL0128.003	1984	0	2010	1990	1155677	40.86	26	11000	0	200000	200000	200000	200000	200000	144677	11	10	10	9	9	8	8	8	7
HEATH	FRANKLIN	SL0130.001	1962	0	1988	1988	20583	0.73	26		1200	1200	1200	1200	0	0	15783	1	1	1	1	1	1	1	1	1
HINGHAM	PLYMOUTH	SL0131.001	1977	1977	2002	1990	279626	9.89	25		14600	14600	14600	14600	14600	14600	192026	14	13	13	12	12	11	11	10	10
HOLBROOK	NORFOLK	SL0133.001	1964	0	1990	1990	132291	4.68	26		6500	6500	6500	6500	10400	10400	85491	6	6	6	5	5	5	5	4	4
HOLBROOK	NORFOLK	SL0133.002	1968	0	1994	1990	128643	4.55	26		7500	7500	7500	7500	0	0	98643	7	7	7	6	6	6	5	5	5
HOLDEN	WORCESTER	SL0134.001	1961	0	1987	1987	129220	4.57	26		8000	8000	8000	0	0	0	105220	8	7	7	7	6	6	6	6	5
HOLDEN	WORCESTER	SL0134.002	1926	0	1952	1952	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
HOLLAND	HAMPDEN	SL0135.001	1969	0	1995	1990	43081	1.52	26		2500	2500	2600	2600	0	0	32881	2	2	2	2	2	2	2	2	2
HOLLISTON	MIDDLESEX	SL0136.001	1932	0	1958	1958	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
HOPEDALE	WORCESTER	SL0138.001	1961	0	1987	1987	169601	6.00	26		10500	10500	10500	0	0	0	138101	10	10	9	9	8	8	8	7	7
HOPEDALE	WORCESTER	SL0138.003	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
HOPKINTON	MIDDLESEX	SL0139.001	1959	0	1985	1985	113220	4.00	26		8000	0	0	0	0	0	105220	8	7	7	7	6	6	6	6	5
HUBBARDSTO	WORCESTER	SL0140.001	1970	1970	1990	1990	19152	0.68	20		1000	1000	1000	1000	1000	1000	13152	1	1	1	1	1	1	1	1	1
HUBBARDSTO	WORCESTER	SL0140.002	1942	0	1968	1968	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
HUBBARDSTO	WORCESTER	SL0140.003	1929	0	1955	1955	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
HUDSON	MIDDLESEX	SL0141.001	1954	0	1980	1980	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
HUDSON	MIDDLESEX	SL0141.002	1988	1988	1994	1990	110857	3.92	6		3000	3000	3000	31200	15600	15600	39457	3	3	3	2	2	2	2	2	2

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HULL	PLYMOUTH	SL0142.002	1968	0	1994	1990	97652	3.45	26		6900	0	0	0	0	0	90752	7	6	6	6	5	5	5	5	5
HUNTINGTON	HAMPDEN	SL0143.001	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
KINGSTON	PLYMOUTH	SL0145.001	1981	0	2007	1990	86186	3.05	26		4500	4500	4500	4500	4500	4500	59186	4	4	4	4	4	3	3	3	3
LAKEVILLE	PLYMOUTH	SL0146.001	1970	0	1996	1990	103423	3.66	26		5400	5400	5400	5400	5400	5400	71023	5	5	5	4	4	4	4	4	4
LANCASTER	PLYMOUTH	SL0147.001	1966	0	1992	1990	76610	2.71	26		4000	4000	4000	4000	4000	4000	52610	4	4	3	3	3	3	3	3	3
LANCASTER	PLYMOUTH	SL0147.002	1938	0	1964	1964	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
LAWRENCE	ESSEX	SL0149.001	1938	0	1964	1964	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
LEE	BERKSHIRE	SL0150.001	1965	0	1991	1990	345677	12.22	26	11000	0	38000	38000	38000	38000	38000	144677	11	10	10	9	9	8	8	8	7
LEE	BERKSHIRE	SL0150.006	1969	0	1995	1990	383	0.01	26		20	20	20	20	20	20	263	0	0	0	0	0	0	0	0	0
LEE	BERKSHIRE	SL0150.007	1965	0	1991	1990	140143	4.96	26		7500	7500	7500	7500	7500	4000	98643	7	7	7	6	6	6	5	5	5
LEICESTER	WORCESTER	SL0151.001	1972	1972	1991	1990	85316	3.02	19		4700	4700	4700	4700	4700	0	61816	4	4	4	4	4	4	3	3	3
LEICESTER	WORCESTER	SL0151.002	1961	0	1987	1987	96915	3.43	26		6000	6000	6000	0	0	0	78915	6	5	5	5	5	5	4	4	4
LEOMINSTER	WORCESTER	SL0153.003	1960	0	1986	1986	77762	2.75	26		5000	7000	0	0	0	0	65762	5	5	4	4	4	4	4	3	3
LEVERETT	FRANKLIN	SL0154.001	1965	0	1991	1990	20352	0.72	26		1000	1000	1300	1300	1300	1300	13152	1	1	1	1	1	1	1	1	1
LINCOLN	MIDDLESEX	SL0157.001	1964	0	1990	1990	97393	3.44	26		5200	5600	5600	5600	5600	1400	68393	5	5	5	4	4	4	4	4	3
LITTLETON	MIDDLESEX	SL0158.001	1962	0	1988	1988	77186	2.73	26		4500	4500	4500	4500	0	0	59186	4	4	4	4	4	3	3	3	3
LONGMEADOW	HAMPDEN	SL0159.002	1967	0	1993	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
LOWELL	MIDDLESEX	SL0160.001	1990	1990	1995	1990	1419400	50.19	5		71500	81500	81500	81500	81500	81500	940400	68	65	62	59	57	54	52	49	47
LUDLOW	HAMPDEN	SL0161.002	1968	0	1994	1990	148420	5.25	26		8000	8000	6800	6800	6800	6800	105220	8	7	7	7	6	6	6	6	5
LUNENBURG	WORCESTER	SL0162.001	1975	0	2001	1990	115415	4.08	26		6000	6000	6000	6000	6000	6500	78915	6	5	5	5	5	5	4	4	4
LYNN	ESSEX	SL0163.001	1962	0	1988	1988	70325	2.49	26		4100	4100	4100	4100	0	0	53925	4	4	4	3	3	3	3	3	3
LYNN	ESSEX	SL0163.002	1964	0	1990	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
LYNN	ESSEX	SL0163.003	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MANCHESTER	ESSEX	SL0166.001	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MANSFIELD	BRISTOL	SL0167.001	1961	0	1987	1987	161524	5.71	26		10000	10000	10000	0	0	0	131524	10	9	9	8	8	8	7	7	7
MARION	PLYMOUTH	SL0169.001	1968	1968	1999	1990	440506	15.58	31		23000	23000	23000	23000	23000	23000	302506	22	21	20	19	18	17	17	16	15
MARLBOROUG	MIDDLESEX	SL0170.001	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MARSHFIELD	PLYMOUTH	SL0171.004	1980	0	2006	1990	227906	8.06	26		12500	10200	10200	10200	10200	10200	164406	12	11	11	10	10	9	9	9	8
MARSHFIELD	PLYMOUTH	SL0171.007	1947	0	1973	1973	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MASHPEE	BARNSTABLE	SL0172.001	1975	0	2001	1990	105338	3.72	26		5500	5500	5500	5500	5500	5500	72338	5	5	5	5	4	4	4	4	4
MATTAPOISE	PLYMOUTH	SL0173.001	1946	0	1972	1972	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MATTAPOISE	PLYMOUTH	SL0173.002	1934	0	1960	1960	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MATTAPOISE	PLYMOUTH	SL0173.003	1972	1972	1999	1990	42135	1.49	27		2200	2200	2200	2200	2200	2200	28935	2	2	2	2	2	2	2	2	1
MAYNARD	MIDDLESEX	SL0174.001	1957	0	1983	1983	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MEDFIELD	NORFOLK	SL0175.001	1974	0	2000	1990	144298	5.10	26		7200	7200	7200	7200	10400	10400	94698	7	7	6	6	6	5	5	5	5
MEDWAY	NORFOLK	SL0177.002	1894	0	1920	1920	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MEDWAY	NORFOLK	SL0177.003	1956	0	1982	1982	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MENDON	WORCESTER	SL0179.001	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MERRIMAC	ESSEX	SL0180.003	1970	0	1996	1990	59373	2.10	26		3100	3100	3100	3100	3100	3100	40773	3	3	3	3	2	2	2	2	2
MERRIMAC	ESSEX	SL0180.005	1943	0	1969	1969	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
METHUEN	ESSEX	SL0181.001	1965	0	1991	1990	554573	19.61	26		30000	26000	26000	26000	26000	26000	394573	29	27	26	25	24	23	22	21	20
MIDDLEBORO	PLYMOUTH	SL0182.002	1966	0	1992	1990	194524	6.88	26		10000	10600	10600	10600	10600	10600	131524	10	9	9	8	8	8	7	7	7
MIDDLEFIEL	HAMPSHIRE	SL0183.003	1964	0	1990	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MIDDLETON	ESSEX	SL0184.002	1977	1977	1994	1990	80440	2.84	17		4200	4200	4200	4200	4200	4200	55240	4	4	4	3	3	3	3	3	3
MIDDLETON	ESSEX	SL0184.003	1961	0	1987	1987	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MILFORD	WORCESTER	SL0185.001	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MILLBURY	WORCESTER	SL0186.001	1961	0	1987	1987	193829	6.85	26		12000	12000	12000	0	0	0	157829	11	11	10	10	10	9	9	8	8
MILLIS	NORFOLK	SL0187.001	1963	0	1989	1989	164663	5.82	26		9600	9600	9600	9600	0	0	126263	9	9	8	8	8	7	7	7	6
MILTON	NORFOLK	SL0189.001	1965	65	1991	1990	488387	17.27	26		25500	25500	25500	25500	25500	25500	335387	24	23	22	21	20	19	18	18	17
MONSON	HAMPDEN	SL0191.002	1951	0	1977	1977	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MONTAGUE	FRANKLIN	SL0192.001	1967	0	1993	1990	136967	4.84	26		7000	10700	6800	6800	6800	6800	92067	7	6	6	6	6	5	5	5	5
								2074.1																		

APPENDIX

LANDFILL NMOC EMISSIONS 1990
SORTED BY TOWNS

f2.2:Montague-end

1 TOWN	2 COUNTY	3 ID	4 EST OPEN BASE	5 OPEN BASE	6 CLOSE BASE	7 CURRE YEAR	8 TOTAL REFUS TONS	9 EF35.36 NMOC TONS 1990	10 LFILL AGE	11 EST CLOSE YR TPY	12 LTPY 1985	13 LTPY 1986	14 LTPY 1987	15 LTPY 1988	16 LTPY 1989	17 LTPY 1990	18 REFUSE 64-84	19 84 TTN	20 83 TTN	21 82 TTN	22 81 TTN	23 80 TTN	24 79 TTN	25 78 TTN	26 77 TTN	27 76 TTN
=========	========	==========	====	====	=====	=====	======	======	=====	======	======	======	======	======	======	======	=======	==	==	==	==	==	==	==	==	==
ABINGTON	PLYMOUTH	SL0001.003	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ACTON	MIDDLESEX	SL0002.003	1962	0	1988	1988	214406	7.58	26		12500	12500	12500	12500	0	0	164406	12	11	11	10	10	9	9	9	8
MONTAGUE	FRANKLIN	SL0192.001	1967	0	1993	1990	136967	4.84	26		7000	10700	6800	6800	6800	6800	92067	7	6	6	6	6	5	5	5	5
CHESTERFIE	HAMPSHIRE	SL0060.002	1963	0	1989	1989	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
CHICOPEE	HAMPDEN	SL0061.006	1965	0	1991	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
DOUGLAS	WORCESTER	SL0077.005	1961	0	1987	1987	72686	2.57	26		4500	4500	4500	0	0	0	59186	4	4	4	4	4	3	3	3	3
HADLEY	HAMPSHIRE	SL0117.003	1959	0	1985	1985	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
HOLYOKE	HAMPDEN	SL0137.006	1965	0	1991	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MALDEN	MIDDLESEX	SL0165.004	1934	0	1960	1960	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
MONTEREY	BERKSHIRE	SL0193.001	1955	0	1981	1981	19152	0.68	26		1000	1000	1000	1000	1000	1000	13152	1	1	1	1	1	1	1	1	1
NANTUCKET	NANTUCKET	SL0197.001	1940	1940	2003	1990	232829	8.23	63		12000	12000	12000	12000	12000	15000	157829	11	11	10	10	10	9	9	8	8
NATICK	MIDDLESEX	SL0198.001	1969	0	1995	1990	421354	14.90	26		22000	22000	22000	22000	22000	22000	289354	21	20	19	18	17	17	16	15	15
NEEDHAM	NORFOLK	SL0199.001	1969	0	1995	1990	408049	14.43	26		20000	25000	25000	25000	25000	25000	263049	19	18	17	17	16	15	14	14	13
NEW ASHFOR	BERKSHIRE	SL0200.001	1964	0	1990	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NEW BEDFOR	BRISTOL	SL0201.001	1966	0	1992	1990	2797866	98.93	26		150000	150000	150000	150000	150000	75000	1972866	143	137	131	125	119	114	109	104	99
NEW BEDFOR	BRISTOL	SL0201.003	1964	0	1990	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NEW BEDFOR	BRISTOL	SL0201.004	1929	0	1955	1955	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NEW MARLBO	BERKSHIRE	SL0203.003	1955	0	1981	1981	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NEWBURY	ESSEX	SL0205.002	1960	1960	1994	1990	62968	2.23	34		3200	1040	1040	5200	5200	5200	42088	3	3	3	3	3	2	2	2	2
NEWBURYPOR	ESSEX	SL0206.001	1960	0	1986	1986	220210	7.79	26		14500	15000	0	0	0	0	190710	14	13	13	12	12	11	11	10	10
NEWTON	MIDDLESEX	SL0207.001	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NEWTON	MIDDLESEX	SL0207.003	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NEWTON	MIDDLESEX	SL0207.005	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NORFOLK	NORFOLK	SL0208.001	1983	1983	1992	1990	76610	2.71	9		4000	4000	4000	4000	4000	4000	52610	4	4	3	3	3	3	3	3	3
NORTH ADAM	BERKSHIRE	SL0209.003	1966	0	1992	1990	363896	12.87	26		19000	19000	19000	19000	19000	19000	249896	18	17	17	16	15	14	14	13	13
NORTH ATTL	BRISTOL	SL0211.001	1978	1978	2006	1990	271829	9.61	28		12000	20400	20400	20400	20400	20400	157829	11	11	10	10	10	9	9	8	8
NORTH BROO	WORCESTER	SL0212.001	1964	0	1990	1990	47881	1.69	26		2500	2500	2500	2500	2500	2500	32881	2	2	2	2	2	2	2	2	2
NORTH BROO	WORCESTER	SL0212.003	1914	0	1940	1940	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NORTH BROO	WORCESTER	SL0212.004	1904	0	1930	1930	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NORTH READ	MIDDLESEX	SL0213.001	1942	0	1968	1968	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NORTHAMPTO	HAMPSHIRE	SL0214.001	1967	0	1993	1990	484811	17.14	26		25000	28000	26000	26000	26000	25000	328811	24	23	22	21	20	19	18	17	17
NORTHBOROU	WORCESTER	SL0215.002	1934	0	1960	1960	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NORTHBRIDG	WORCESTER	SL0216.001	1962	0	1988	1988	128643	4.55	26		7500	7500	7500	7500	0	0	98643	7	7	7	6	6	6	5	5	5
NORTON	BRISTOL	SL0218.002	1964	0	1990	1990	172448	6.10	26		9500	9500	9500	9500	9500	0	124948	9	9	8	8	8	7	7	7	6
NORWELL	PLYMOUTH	SL0219.003	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
NORWOOD	NORFOLK	SL0220.002	1962	0	1988	1988	363632	12.86	26		21200	21200	21200	21200	0	0	278832	20	19	18	18	17	16	15	15	14
OAK BLUFFS	DUKES	SL0221.001	1970	0	1996	1990	50461	1.78	26		2500	2500	2500	3790	3790	2500	32881	2	2	2	2	2	2	2	2	2
OAKHAM	WORCESTER	SL0222.001	1965	0	1991	1990	11491	0.41	26		600	600	600	600	600	600	7891	1	1	1	0	0	0	0	0	0
ORANGE	FRANKLIN	SL0223.003	1965	0	1991	1990	96562	3.41	26		5000	5000	5200	5200	5200	5200	65762	5	5	4	4	4	4	4	3	3
ORLEANS	BARNSTABLE	SL0224.001	1966	0	1992	1990	99593	3.52	26		5200	5200	5200	5200	5200	5200	68393	5	5	5	4	4	4	4	4	3
OXFORD	WORCESTER	SL0226.002	1961	0	1987	1987	113067	4.00	26		7000	7000	7000	0	0	0	92067	7	6	6	6	6	5	5	5	5

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OXFORD	WORCESTER	SL0226.002	1961	0	1987	1987	113067	4.00	26		7000	7000	7000	0	0	0	92067	7	6	6	6	6	5	5	5	5
PALMER	HAMPDEN	SL0227.001	1966	0	1992	1990	186724	6.60	26		10000	10800	8600	8600	8600	8600	131524	10	9	9	8	8	8	7	7	7
PAXTON	WORCESTER	SL0228.002	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
PEABODY	ESSEX	SL0229.001	1967	0	1993	1990	2506918	88.64	26		58500	59500	59500	0	780000	780000	769418	56	53	51	49	46	44	42	40	39
PEMBROKE	PLYMOUTH	SL0231.001	1979	1979	1992	1990	105338	3.72	13		5500	5500	5500	5500	5500	5500	72338	5	5	5	5	4	4	4	4	4
PEPPERELL	MIDDLESEX	SL0232.001	1976	1976	1992	1990	95762	3.39	16		5000	5000	5000	5000	5000	5000	65762	5	5	4	4	4	4	4	3	3
PLAINVILLE	NORFOLK	SL0238.002	1974	1974	1995	1990	5960672	210.77	21		234000	234000	547500	469500	615500	782500	3077672	223	213	204	195	186	178	170	162	155
PLYMOUTH	PLYMOUTH	SL0239.001	1967	0	1993	1990	1244909	44.02	26		65000	65000	65000	65000	65000	65000	854909	62	59	57	54	52	49	47	45	43
PLYMOUTH	PLYMOUTH	SL0239.003	1964	0	1990	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
PRINCETON	WORCESTER	SL0241.001	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
PRINCETON	WORCESTER	SL0241.002	1962	0	1988	1988	25729	0.91	26		1500	1500	1500	1500	0	0	19729	1	1	1	1	1	1	1	1	1
PROVINCETO	BARNSTABLE	SL0242.002	1964	0	1990	1990	80440	2.84	26		4200	4200	4200	4200	4200	4200	55240	4	4	4	3	3	3	3	3	3
QUINCY	NORFOLK	SL0243.001	1961	0	1987	1987	1041833	36.84	26		64500	64500	64500	0	0	0	848333	62	59	56	54	51	49	47	45	43
RANDOLPH	NORFOLK	SL0244.001	1968	0	1994	1990	663639	23.47	26		32500	32500	32500	63121	52000	23564	427454	31	30	28	27	26	25	24	22	21
RAYNHAM	BRISTOL	SL0245.001	1976	1976	1997	1990	105338	3.72	21		5500	5500	5500	5500	5500	5500	72338	5	5	5	5	4	4	4	4	4
RAYNHAM	BRISTOL	SL0245.003	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
REHOBOTH	BRISTOL	SL0247.003	1974	1974	1996	1990	105338	3.72	22		5500	5500	5500	5500	5500	5500	72338	5	5	5	5	4	4	4	4	4
RICHMOND	BERKSHIRE	SL0249.001	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ROCHESTER	PLYMOUTH	SL0250.001	1964	0	1990	1990	76610	2.71	26		4000	4000	4000	4000	4000	4000	52610	4	4	3	3	3	3	3	3	3
ROCKLAND	PLYMOUTH	SL0251.001	1967	0	1993	1990	384049	13.58	26		20000	20200	20200	20200	20200	20200	263049	19	18	17	17	16	15	14	14	13
ROCKLAND	PLYMOUTH	SL0251.002	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
ROCKPORT	ESSEX	SL0252.002	1962	0	1988	1988	85762	3.03	26		5000	5000	5000	5000	0	0	65762	5	5	4	4	4	4	4	3	3
ROWLEY	ESSEX	SL0254.003	1958	1958	1991	1990	55542	1.96	33		2900	2900	2900	2900	2900	2900	38142	3	3	3	2	2	2	2	2	2
ROYALSTON	WORCESTER	SL0255.001	1969	0	1995	1990	158677	5.61	26	11000	0	600	600	600	600	600	144677	11	10	10	9	9	8	8	8	7
RUTLAND	WORCESTER	SL0257.001	1945	0	1971	1971	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
RUTLAND	WORCESTER	SL0257.002	1971	1971	1989	1989	40381	1.43	18		2500	2500	2500	0	0	0	32881	2	2	2	2	2	2	2	2	2
SALEM	ESSEX	SL0258.001	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SALISBURY	ESSEX	SL0259.001	1966	0	1992	1990	82356	2.91	26		4300	4300	4300	4300	4300	4300	56556	4	4	4	4	3	3	3	3	3
SANDWICH	BARNSTABLE	SL0261.002	1964	0	1990	1990	210677	7.45	26		11000	11000	11000	11000	11000	11000	144677	11	10	10	9	9	8	8	8	7
SAUGUS	ESSEX	SL0262.002	1961	0	1987	1987	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SAUGUS	ESSEX	SL0262.004	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SAUGUS	ESSEX	SL0262.007	1938	1938	1985	1985	155677	5.50	47	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SAVOY	BERKSHIRE	SL0263.001	1965	0	1991	1990	7261	0.26	26		400	400	400	400	400	0	5261	0	0	0	0	0	0	0	0	0
SCITUATE	PLYMOUTH	SL0264.001	1975	1975	1996	1990	383049	13.54	21		20000	20000	20000	20000	20000	20000	263049	19	18	17	17	16	15	14	14	13
SEEKONK	BRISTOL	SL0265.001	1963	0	1989	1989	113643	4.02	26		7500	7500	0	0	0	0	98643	7	7	7	6	6	6	5	5	5
SHARON	NORFOLK	SL0266.001	1959	0	1985	1985	287287	10.16	26		15000	15000	15000	15000	15000	15000	197287	14	14	13	12	12	11	11	10	10
SHEFFIELD	BERKSHIRE	SL0267.002	1951	0	1977	1977	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SHERBORN	MIDDLESEX	SL0269.001	1961	0	1987	1987	46842	1.66	26		2900	2900	2900	0	0	0	38142	3	3	3	2	2	2	2	2	2
SHIRLEY	MIDDLESEX	SL0270.001	1966	0	1992	1990	86186	3.05	26		4500	4500	4500	4500	4500	4500	59186	4	4	4	4	4	3	3	3	3
SHREWSBURY	WORCESTER	SL0271.001	1962	0	1988	1988	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SOMERSET	BRISTOL	SL0273.001	1960	0	1986	1986	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SOUTH HADL	HAMPSHIRE	SL0275.001	1965	1965	1992	1990	337544	11.94	27		18000	18000	15600	15600	15600	18000	236744	17	16	16	15	14	14	13	12	12
SOUTHAMPTO	HAMPSHIRE	SL0276.001	1971	1971	2001	1990	48281	1.71	30		2500	2500	2600	2600	2600	2600	32881	2	2	2	2	2	2	2	2	2
SOUTHBOROU	WORCESTER	SL0277.002	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SOUTHBOROU	WORCESTER	SL0277.003	1927	0	1953	1953	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SOUTHBRIDG	WORCESTER	SL0278.001	1931	0	1957	1957	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SOUTHBRIDG	WORCESTER	SL0278.002	1980	1980	2000	1990	191524	6.77	20		10000	10000	10000	10000	10000	10000	131524	10	9	9	8	8	8	7	7	7
SOUTHBRIDG	WORCESTER	SL0278.003	1946	0	1972	1972	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SOUTHWICK	HAMPDEN	SL0279.002	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SPENCER	WORCESTER	SL0280.005	1961	0	1987	1987	104991	3.71	26		6500	6500	6500	0	0	0	85491	6	6	6	5	5	5	5	4	4
SPRINGFIEL	HAMPDEN	SL0281.003	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7

APPENDIX

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WESTMINSTEWORCESTER SL0332.001 1970     0 1996  1990  827098    29.25   26          40000  52200  52200  52200  52200  52200    526098  38  36  35  33  32  30  29  28  26
WESTON    MIDDLESEX SL0333.001 1962     0 1988  1988  125213     4.43   26           7300   7300   7300   7300      0      0     96013   7   7   6   6   6   6   5   5   5
WESTPORT  BRISTOL   SL0334.002 1964     0 1990  1990   99593     3.52   26           5200   5200   5200   5200   5200   5200     68393   5   5   5   4   4   4   4   4   3
WEYMOUTH  NORFOLK   SL0336.003 1939     0 1965  1965  155677     5.50   26  11000       0      0      0      0      0      0    144677  11  10  10   9   9   8   8   8   7
WHITMAN   PLYMOUTH  SL0338.001 1949     0 1975  1975  155677     5.50   26  11000       0      0      0      0      0      0    144677  11  10  10   9   9   8   8   8   7
WILBRAHAM HAMPDEN   SL0339.001 1965     0 1991  1990  143643     5.08   26           7500   7500   7500   7500   7500   7500     98643   7   7   7   6   6   6   5   5   5
WILBRAHAM HAMPDEN   SL0339.002 1945     0 1971  1971  155677     5.50   26  11000       0      0      0      0      0      0    144677  11  10  10   9   9   8   8   8   7
WILLIAMSTOBERKSHIRE SL0341.006 1947     0 1973  1973  155677     5.50   26  11000       0      0      0      0      0      0    144677  11  10  10   9   9   8   8   8   7
WILLIAMSTOBERKSHIRE SL0341.008 1968     0 1994  1990  155677     5.50   26  11000       0      0      0      0      0      0    144677  11  10  10   9   9   8   8   8   7
WILMINGTONMIDDLESEX SL0342.003 1950     0 1976  1976  155677     5.50   26  11000       0      0      0      0      0      0    144677  11  10  10   9   9   8   8   8   7
WINCHENDONWORCESTER SL0343.001 1966     0 1992  1990   76610     2.71   26           4000   4000   4000   4000   4000   4000     52610   4   4   3   3   3   3   3   3   3
WINDSOR   BERKSHIRE SL0345.002 1963     0 1989  1989    9221     0.33   26            508    508    508    508    508      0      6681   0   0   0   0   0   0   0   0   0
WOBURN    MIDDLESEX SL0347.001 1961     0 1987  1987  401540    14.20   26          26500  26500      0      0      0      0    348540  25  24  23  22  21  20  19  18  18
WORCESTER WORCESTER SL0348.004 1959     0 1985  1985 2094562    74.06   26         148000      0      0      0      0      0   1946562 141 135 129 123 118 112 107 102  98
WORTHINGTOHAMPSHIRE SL0349.001 1964     0 1990  1990  155677     5.50   26  11000       0      0      0      0      0      0    144677  11  10  10   9   9   8   8   8   7
YARMOUTH  BARNSTABLESL0351.003 1941     0 1967  1967  155677     5.50   26  11000       0      0      0      0      0      0    144677  11  10  10   9   9   8   8   8   7
YARMOUTH  BARNSTABLESL0351.005 1968     0 1994  1990  480735    17.00   26          24500  24500  24500  24500  24500  36000    322235  23  22  21  20  19  19  18  17  16
          TOTAL                                                1438.83
```

SPRINGFIEL	HAMPDEN	SL0281.003	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
STERLING	WORCESTER	SL0282.001	1971	1971	1990	1990	67034	2.37	19		3500	3500	3500	3500	3500	3500	46034	3	3	3	3	3	3	3	2	2
STOCKBRIDG	BERKSHIRE	SL0283.003	1964	0	1990	1990	766	0.03	26		40	40	40	40	40	40	526	0	0	0	0	0	0	0	0	0
STONEHAM	MIDDLESEX	SL0284.001	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
STONEHAM	MIDDLESEX	SL0284.002	1920	0	1946	1946	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
STOUGHTON	NORFOLK	SL0285.001	1950	0	1976	1976	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
STOW	MIDDLESEX	SL0286.002	1961	0	1987	1987	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
STURBRIDGE	WORCESTER	SL0287.001	1970	1970	2000	1990	67034	2.37	30		3500	3500	3500	3500	3500	3500	46034	3	3	3	3	3	3	3	2	2
STURBRIDGE	WORCESTER	SL0287.005	1947	0	1973	1973	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SUDBURY	MIDDLESEX	SL0288.001	1967	0	1993	1993	211524	7.48	26		10000	14000	14000	14000	14000	14000	131524	10	9	9	8	8	8	7	7	7
SUDBURY	MIDDLESEX	SL0288.003	1944	0	1970	1970	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SUNDERLAND	FRANKLIN	SL0289.003	1966	0	1992	1990	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
SUTTON	WORCESTER	SL0290.002	1972	1972	1995	1990	67034	2.37	23		3500	3500	3500	3500	3500	3500	46034	3	3	3	3	3	3	3	2	2
SWAMPSCOTT	ESSEX	SL0291.002	1912	0	1938	1938	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
TAUNTON	BRISTOL	SL0293.002	1967	0	1993	1990	535040	18.92	26		26500	27000	27000	27000	27000	52000	348540	25	24	23	22	21	20	19	18	18
TEMPLETON	WORCESTER	SL0294.001	1954	0	1980	1980	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
TEMPLETON	WORCESTER	SL0294.002	1934	0	1960	1960	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
TEMPLETON	WORCESTER	SL0294.003	1964	0	1990	1990	95762	3.39	26		5000	5000	5000	5000	5000	5000	65762	5	5	4	4	4	4	4	3	3
TEWKSBURY	MIDDLESEX	SL0295.001	1931	0	1957	1957	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
TEWKSBURY	MIDDLESEX	SL0295.002	1931	0	1957	1957	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
TISBURY	DUKES	SL0296.002	1966	0	1992	1990	41665	1.47	26		2000	2000	2000	3120	3120	3120	26305	2	2	2	2	2	2	1	1	1
TOPSFIELD	ESSEX	SL0298.002	1971	1971	2001	1990	99593	3.52	30		5200	5200	5200	5200	5200	5200	68393	5	5	5	4	4	4	4	4	3
TOWNSEND	MIDDLESEX	SL0299.002	1978	1978	1991	1990	86186	3.05	13		4500	4500	4500	4500	4500	4500	59186	4	4	4	4	4	3	3	3	3
TRURO	BARNSTABLE	SL0300.001	1964	0	1990	1990	47881	1.69	26		2500	2500	2500	2500	2500	2500	32881	2	2	2	2	2	2	2	2	2
TYNGSBOROU	MIDDLESEX	SL0301.001	1958	0	1984	1984	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
UXBRIDGE	WORCESTER	SL0304.001	1962	0	1988	1988	85762	3.03	26		5000	5000	5000	5000	0	0	65762	5	5	4	4	4	4	4	3	3
WALPOLE	NORFOLK	SL0307.005	1954	0	1980	1980	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
WALTHAM	MIDDLESEX	SL0308.001	1963	0	1989	1989	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
WALTHAM	MIDDLESEX	SL0308.002	1948	0	1974	1974	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
WARE	HAMPSHIRE	SL0309.001	1967	0	1993	1990	608150	21.50	26		30500	30500	36500	36500	36500	36500	401150	29	28	27	25	24	23	22	21	20
WAREHAM	PLYMOUTH	SL0310.001	1947	0	1973	1973	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
WARREN	WORCESTER	SL0311.001	1950	1950	1990	1990	47881	1.69	40		2500	2500	2500	2500	2500	2500	32881	2	2	2	2	2	2	2	2	2
WARWICK	FRANKLIN	SL0312.001	1972	71	1998	1990	11251	0.40	26		600	600	520	520	520	600	7891	1	1	1	0	0	0	0	0	0
WASHINGTON	BERKSHIRE	SL0313.001	1951	0	1977	1977	1090	0.04	26		77	0	0	0	0	0	1013	0	0	0	0	0	0	0	0	0
WATERTOWN	MIDDLESEX	SL0314.002	1935	0	1961	1961	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
WATERTOWN	MIDDLESEX	SL0314.003	1930	0	1956	1956	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
WAYLAND	MIDDLESEX	SL0315.004	1975	0	2001	1990	344744	12.19	26		18000	18000	18000	18000	18000	18000	236744	17	16	16	15	14	14	13	12	12
WEBSTER	WORCESTER	SL0316.001	1962	0	1988	1988	428811	15.16	26		25000	25000	25000	25000	0	0	328811	24	23	22	21	20	19	18	17	17
WELLESLEY	NORFOLK	SL0317.001	1949	0	1975	1975	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
WELLFLEET	BARNSTABLE	SL0318.001	1966	0	1992	1992	57457	2.03	26		3000	3000	3000	3000	3000	3000	39457	3	3	3	2	2	2	2	2	2
WEST BOYLS	WORCESTER	SL0321.001	1960	0	1986	1986	60610	2.14	26		4000	4000	0	0	0	0	52610	4	4	3	3	3	3	3	3	3
WEST BRIDG	PLYMOUTH	SL0322.001	1961	0	1987	1987	64610	2.28	26		4000	4000	4000	0	0	0	52610	4	4	3	3	3	3	3	3	3
WEST BROOK	WORCESTER	SL0323.001	1978	1978	1993	1990	38305	1.35	15		2000	2000	2000	2000	2000	2000	26305	2	2	2	2	2	2	1	1	1
WEST NEWBU	ESSEX	SL0324.001	1960	0	1986	1986	30305	1.07	26		2000	2000	0	0	0	0	26305	2	2	2	2	2	2	1	1	1
WEST TISBU	DUKES	SL0327.001	1964	0	1990	1990	17143	0.61	26		800	800	800	1407	1407	1407	10522	1	1	1	1	1	1	1	1	1
WESTBOROUG	WORCESTER	SL0328.001	1964	0	1990	1990	605230	21.40	26		22500	22500	22500	80600	80600	80600	295930	21	21	20	19	18	17	16	16	15
WESTFIELD	HAMPDEN	SL0329.001	1966	0	1992	1990	964727	34.11	26		52000	52000	44200	44200	44200	44200	683927	50	47	45	43	41	39	38	36	34
WESTFIELD	HAMPDEN	SL0329.002	1924	0	1950	1950	155677	5.50	26	11000	0	0	0	0	0	0	144677	11	10	10	9	9	8	8	8	7
WESTFORD	MIDDLESEX	SL0330.001	1959	0	1985	1985	113220	4.00	26		8000	0	0	0	0	0	105220	8	7	7	7	6	6	6	6	5
WESTHAMPTO	HAMPSHIRE	SL0331.001	1971	0	1997	1990	19792	0.70	26		1095	1095	800	800	800	800	14402	1	1	1	1	1	1	1	1	1
WESTMINSTE	WORCESTER	SL0332.001	1970	0	1996	1990	827098	29.25	26		40000	52200	52200	52200	52200	52200	526098	38	36	35	33	32	30	29	28	26

APPENDIX TABLE B.1-4

LANDFILL NMOC EMISSIONS 1990 BY EMISSION FACTOR AND LANDFILL MODEL (LAEM) -SORTED BY COUNTIES

ref1AM
ref1:Abington-Montague

TOWN	COUN	ID	EST OPEN BASE	ACT OPEN BASE	ACT CLOSE BASE	CURR/ CLOS YEAR	ESTIM DESIGN CAPCTY TONS	1990 TOTAL REFUS TONS	EF 35.36 NMOC TONS 1990	LAEM NMOC TONS 1990
BARNSTAB	BARN	SL0020.001	1973	1973	1996	1990	1036485	766098	27.1	173.0
BOURNE	BARN	SL0036.003	1962	0	1988	1988	155677	155677	5.5	31.1
BOURNE	BARN	SL0036.004	1968	1968	2000	1990	409033	281210	9.9	60.6
BREWSTER	BARN	SL0041.001	1982	0	2008	1990	404595	124491	4.4	30.7
CHATHAM	BARN	SL0055.001	1977	1977	1995	1990	164416	118745	4.2	27.9
DENNIS	BARN	SL0075.001	1957	1957	1998	1990	333136	268134	9.5	52.3
EASTHAM	BARN	SL0086.001	1967	0	1993	1990	206730	182877	6.5	39.1
FALMOUTH	BARN	SL0096.001	1974	1974	2001	1990	921113	545845	19.3	124.4
HARWICH	BARN	SL0126.001	1967	1967	2003	1990	254811	162796	5.8	34.8
MASHPEE	BARN	SL0172.001	1975	0	2001	1990	182587	105338	3.7	24.2
	TOTAL								95.9	597.9
ADAMS	BERK	SL0004.001	1966	1966	1993	1990	264183	234829	8.3	49.7
BECKET	BERK	SL0022.001	1942	0	1968	1968	155677	155677	5.5	20.9
CHESHIRE	BERK	SL0058.001	1950	0	1976	1976	155677	155677	5.5	24.5
EGREMONT	BERK	SL0090.001	1962	0	1988	1988	34305	34305	1.2	6.9
GREAT BA	BERK	SL0113.002	1975	1975	1993	1990	258812	215677	7.6	49.6
LEE	BERK	SL0150.001	1965	0	1991	1990	359504	345677	12.2	72.[illegible]
LEE	BERK	SL0150.007	1965	0	1991	1990	145749	140143	5.0	29.4
LEE	BERK	SL0150.006	1969	0	1995	1990	474	383	0.0	0.1
	TOTAL								45.3	253.4
ACUSHNET	BRIS	SL0003.001	1961	0	1987	1987	1372958	1372958	48.5	268.6
ATTLEBOR	BRIS	SL0016.001	1967	0	1993	1990	1766817	1562953	55.3	333.7
BERKLEY	BRIS	SL0027.001	1946	0	1972	1972	155677	155677	5.5	22.6
BERKLEY	BRIS	SL0027.004	1944	0	1970	1970	155677	155677	5.5	21.7
DARTMOUT	BRIS	SL0072.004	1966	0	1992	1990	418761	386549	13.7	81.8
DIGHTON	BRIS	SL0076.002	1944	0	1970	1970	155677	155677	5.5	21.7
DIGHTON	BRIS	SL0076.001	1969	0	1995	1990	47425	38305	1.4	8.3
EASTON	BRIS	SL0088.007	1946	0	1972	1972	155677	155677	5.5	22.6
EASTON	BRIS	SL0088.001	1970	0	1996	1990	211634	162796	5.8	35.7
FAIRHAVE	BRIS	SL0094.001	1972	1972	2011	1990	663951	306439	10.8	68.6
FALL RIV	BRIS	SL0095.001	1942	0	1968	1968	155677	155677	5.5	20.9
FALL RIV	BRIS	SL0095.002	1938	1938	1997	1990	5046677	4447918	157.3	736.6
FREETOWN	BRIS	SL0102.003	1969	0	1995	1990	137942	111415	3.9	24.2
MANSFIEL	BRIS	SL0167.001	1961	0	1987	1987	161524	161524	5.7	31.6
	TOTAL								329.9	1698.7
CHILMARK	DUKE	SL0062.001	1950	1950	1995	1990	16806	14939	0.5	2.7
EDGARTOW	DUKE	SL0089.003	1967	0	1993	1990	58761	51981	1.8	11.1
GAY HEAD	DUKE	SL0104.001	1963	0	1989	1989	5146	5146	0.2	1.0
GOSNOLD	DUKE	SL0109.002	1964	0	1990	1990	155677	155677	5.5	32.3
GOSNOLD	DUKE	SL0109.001	1961	0	1987	1987	646	646	0.0	12.[illegible]
	TOTAL								8.1	59.8

AMESBURYESSESL0007.001	1951	0	1977	1977	155677	155677	5.5	25.0
AMESBURYESSESL0007.004	1962	0	1988	1988	155677	155677	5.5	31.1
BEVERLY ESSESL0030.004	1960	0	1986	1986	500031	500031	17.7	95.9
BOXFORD ESSESL0038.001	1944	1944	1994	1990	114498	105338	3.7	18.4
DANVERS ESSESL0071.002	1962	0	1988	1988	155677	155677	5.5	31.1
DANVERS ESSESL0071.003	1941	0	1967	1967	155677	155677	5.5	26.5
ESSEX ESSESL0092.001	1959	0	1985	1985	16983	16983	0.6	3.2
GLOUCESTESSESL0107.001	1962	0	1988	1988	548878	548878	19.4	109.5
HAMILTONESSESL0119.001	1958	0	1984	1984	155677	155677	5.5	28.7
HAVERHILESSESL0128.003	1984	0	2010	1990	5007933	1155677	40.9	290.1
LAWRENCEESSESL0149.001	1938	0	1964	1964	155677	155677	5.5	19.3
LYNN ESSESL0163.002	1964	0	1990	1990	155677	155677	5.5	32.3
LYNN ESSESL0163.001	1962	0	1988	1988	70325	70325	2.5	14.0
LYNN ESSESL0163.003	1962	0	1988	1988	155677	155677	5.5	31.1
MANCHESTESSESL0166.001	1962	0	1988	1988	155677	155677	5.5	31.1
MERRIMACESSESL0180.003	1970	0	1996	1990	77184	59373	2.1	13.0
MERRIMACESSESL0180.005	1943	0	1969	1969	155677	155677	5.5	21.3
METHUEN ESSESL0181.001	1965	0	1991	1990	576756	554573	19.6	116.3
MIDDLETOESSESL0184.003	1961	0	1987	1987	155677	155677	5.5	30.5
MIDDLETOESSESL0184.002	1977	1977	1994	1990	105191	80440	2.8	18.9
TOTAL							169.9	987.0
BERNARDSFRANSL0029.001	1955	1955	1992	1990	19401	18352	0.6	3.5
BUCKLANDFRANSL0047.001	1968	0	1994	1990	24053	20352	0.7	4.4
CHARLEMOFRANSL0053.001	1946	0	1972	1972	155677	155677	5.5	22.6
COLRAIN FRANSL0066.001	1964	0	1990	1990	155677	155677	5.5	32.3
COLRAIN FRANSL0066.004	1968	0	1994	1990	33007	27929	1.0	6.0
DEERFIELFRANSL0074.001	1967	0	1993	1990	69078	61107	2.2	13.1
GREENFIEFRANSL0114.001	1970	1970	1994	1990	341319	284432	10.1	62.5
HEATH FRANSL0130.001	1962	0	1988	1988	20583	20583	0.7	4.1
LEVERETTFRANSL0154.001	1965	0	1991	1990	21167	20352	0.7	4.3
MONTAGUEFRANSL0192.001	1967	0	1993	1990	154832	136967	4.8	29.3
TOTAL							31.9	182.0
AGAWAM HAMPSL0005.001	1972	0	1998	1990	2733646	1892524	66.9	423.4
BRIMFIELHAMPSL0043.002	1944	0	1970	1970	155677	155677	5.5	21.7
CHICOPEEHAMPSL0061.002	1967	1967	2011	1990	6787111	3547808	125.5	757.5
CHICOPEEHAMPSL0061.001	1966	0	1992	1990	2854334	2634770	93.2	557.4
EAST LONHAMPSL0085.001	1948	0	1974	1974	155677	155677	5.5	23.5
GRANVILLHAMPSL0112.001	1964	0	1990	1990	155677	155677	5.5	32.3
HAMPDEN HAMPSL0120.002	1968	0	1994	1990	59868	50657	1.8	10.9
HOLLAND HAMPSL0135.001	1969	0	1995	1990	53339	43081	1.5	9.4
HUNTINGTHAMPSL0143.001	1962	0	1988	1988	155677	155677	5.5	31.1
LONGMEADHAMPSL0159.002	1967	0	1993	1990	175983	155677	5.5	33.2
LUDLOW HAMPSL0161.002	1968	0	1994	1990	175405	148420	5.2	32.0
MONSON HAMPSL0191.002	1951	0	1977	1977	155677	155677	5.5	25.0
TOTAL							327.1	1957.4
AMHERST HAMPSL0008.002	1976	1976	2001	1990	671159	375849	13.3	87.3
BELCHERTHAMPSL0024.001	1968	0	1994	1990	112701	95362	3.4	20.6
CLARKSBUHAMPSL0063.001	1967	0	1993	1990	32476	28729	1.0	6.1
EASTHAMPHAMPSL0087.003	1943	0	1969	1969	155677	155677	5.5	21.3
EASTHAMPHAMPSL0087.001	1966	0	1992	1990	318976	294439	10.4	62.3
GOSHEN HAMPSL0108.001	1964	0	1990	1990	7661	7661	0.3	1.6

GRANBY	HAMPSL0111.001	1960	1960	1994	1990	2145677	1893244	66.9	379.7
MIDDLEFI	HAMPSL0183.003	1964	0	1990	1990	155677	155677	5.5	32.3
	TOTAL							106.3	610.7
ACTON	MIDDSL0002.003	1962	0	1988	1988	214406	214406	7.6	42.8
ARLINGTO	MIDDSL0010.001	1943	0	1969	1969	155677	155677	5.5	21.3
ARLINGTO	MIDDSL0010.003	1961	0	1987	1987	155677	155677	5.5	30.5
ARLINGTO	MIDDSL0010.004	1921	0	1947	1947	155677	155677	5.5	13.8
ARLINGTO	MIDDSL0010.002	1933	0	1959	1959	155677	155677	5.5	17.5
ASHBY	MIDDSL0012.002	1973	1973	1991	1990	111535	105338	3.7	23.5
ASHBY	MIDDSL0012.004	1949	0	1975	1975	155677	155677	5.5	24.0
AYER	MIDDSL0019.001	1962	0	1988	1988	68610	68610	2.4	13.7
AYER	MIDDSL0019.004	1963	0	1989	1989	155677	155677	5.5	31.7
BELMONT	MIDDSL0026.001	1948	0	1974	1974	155677	155677	5.5	23.5
BILLERIC	MIDDSL0031.006	1961	0	1987	1987	4727562	4727562	167.2	924.8
BOXBOROU	MIDDSL0037.001	1960	0	1986	1986	30305	30305	1.1	5.8
BURLINGT	MIDDSL0048.002	1932	0	1958	1958	155677	155677	5.5	17.1
CAMBRIDG	MIDDSL0049.003	1946	0	1972	1972	155677	155677	5.5	22.6
CHELMSFO	MIDDSL0056.002	1963	0	1989	1989	155677	155677	5.5	31.7
CONCORD	MIDDSL0067.001	1981	1981	1992	1990	567916	464659	16.4	113.3
DUNSTABL	MIDDSL0081.001	1960	1960	1991	1990	19791	19152	0.7	3.8
EVERETT	MIDDSL0093.001	1937	0	1963	1963	155677	155677	5.5	18.9
FRAMINGH	MIDDSL0100.002	1942	0	1968	1968	155677	155677	5.5	20.9
GROTON	MIDDSL0115.001	1974	1974	1990	1990	114915	114915	4.1	26.2
HOLLISTO	MIDDSL0136.001	1932	0	1958	1958	155677	155677	5.5	17.1
HOPKINTO	MIDDSL0139.001	1959	0	1985	1985	113220	113220	4.0	21.[illegible]
HUDSON	MIDDSL0141.002	1988	1988	1994	1990	332572	110857	3.9	29.0
HUDSON	MIDDSL0141.001	1954	0	1980	1980	155677	155677	5.5	26.5
LINCOLN	MIDDSL0157.001	1964	0	1990	1990	97393	97393	3.4	20.2
LITTLETO	MIDDSL0158.001	1962	0	1988	1988	77186	77186	2.7	15.4
LOWELL	MIDDSL0160.001	1948	1948	1995	1990	1999583	1786861	63.2	322.0
MARLBORO	MIDDSL0170.001	1950	0	1976	1976	155677	155677	5.5	24.5
MAYNARD	MIDDSL0174.001	1957	0	1933	1983	155677	155677	5.5	28.1
	TOTAL							368.5	1931.4
BELLINGH	NORFSL0025.003	1947	0	1973	1973	155677	155677	5.5	23.1
BELLINGH	NORFSL0025.002	1964	0	1990	1990	155828	155828	5.5	32.4
BRAINTRE	NORFSL0040.003	1960	0	1986	1986	155677	155677	5.5	32.5
BROOKLIN	NORFSL0046.002	1949	0	1975	1975	155677	155677	5.5	24.0
BROOKLIN	NORFSL0046.001	1949	0	1975	1975	155677	155677	5.5	24.0
CANTON	NORFSL0050.001	1963	0	1989	1989	155677	155677	5.5	31.7
COHASSET	NORFSL0065.001	1970	1970	1990	1990	149389	149389	5.3	32.8
DEDHAM	NORFSL0073.002	1950	0	1976	1976	155677	155677	5.5	26.5
DOVER	NORFSL0078.001	1962	0	1988	1988	60034	60034	2.1	12.0
FOXBOROU	NORFSL0099.001	1974	1974	2001	1990	258558	153220	5.4	34.9
HOLBROOK	NORFSL0133.002	1968	0	1994	1990	152033	128643	4.5	27.7
HOLBROOK	NORFSL0133.001	1964	0	1990	1990	132291	132291	4.7	27.5
MEDFIELD	NORFSL0175.001	1974	0	2000	1990	234484	144298	5.1	32.9
MEDWAY	NORFSL0177.002	1894	0	1920	1920	155677	155677	5.5	8.0
MEDWAY	NORFSL0177.003	1956	0	1982	1982	155677	155677	5.5	27.[illegible]
MILLIS	NORFSL0187.001	1963	0	1989	1989	164663	164663	5.8	33.5
MILTON	NORFSL0189.001	1965	65	1991	1990	507923	488387	17.3	102.4
	TOTAL							99.8	533.3

ABINGTONPLYMSL0001.003	1949	0	1975	1975	155677	155677	5.5	24.0
BRIDGEWAPLYMSL0042.004	1964	0	1990	1990	174872	174872	6.2	36.3
BROCKTONPLYMSL0044.001	1942	0	1968	1968	155677	155677	5.5	20.9
CARVER PLYMSL0052.004	1980	0	2006	1990	1285567	494449	17.5	119.4
DUXBURY PLYMSL0082.001	1951	0	1977	1977	155677	155677	5.5	25.0
EAST BRIPLYMSL0083.003	1978	1978	1995	1990	3564638	2516215	89.0	595.9
EAST BRIPLYMSL0083.001	1969	0	1995	1990	237125	191524	6.8	41.7
HALIFAX PLYMSL0118.003	1979	1979	1992	1990	3482494	2946726	104.2	704.6
HINGHAM PLYMSL0131.001	1977	1977	2002	1990	537742	279626	9.9	65.6
HULL PLYMSL0142.002	1968	0	1994	1990	115407	97652	3.5	21.0
KINGSTONPLYMSL0145.001	1981	0	2007	1990	248982	86186	3.0	21.0
LAKEVILLPLYMSL0146.001	1970	0	1996	1990	134450	103423	3.7	22.7
LANCASTEPLYMSL0147.001	1966	0	1992	1990	82994	76610	2.7	19.3
LANCASTEPLYMSL0147.002	1938	0	1964	1964	155677	155677	5.5	26.5
MARION PLYMSL0169.001	1968	1968	1999	1990	620713	440506	15.6	94.9
MARSHFIEPLYMSL0171.004	1980	0	2006	1990	592554	227906	8.1	55.0
MARSHFIEPLYMSL0171.007	1947	0	1973	1973	155677	155677	5.5	23.1
MATTAPOIPLYMSL0173.003	1972	1972	1999	1990	63203	42135	1.5	9.4
MATTAPOIPLYMSL0173.001	1946	0	1972	1972	155677	155677	5.5	18.5
MATTAPOIPLYMSL0173.002	1934	0	1960	1960	155677	155677	5.5	17.9
MIDDLEBOPLYMSL0182.002	1966	0	1992	1990	210735	194524	6.9	41.2
TOTAL							316.9	2003.8
BOSTON SUFFSL0035.005	1960	0	1986	1986	155677	155677	5.5	29.9
CHELSEA SUFFSL0057.002	1930	0	1956	1956	155677	155677	5.5	20.1
TOTAL							11.0	49.9
ASHBURNHWORCSL0011.003	1951	0	1977	1977	155677	155677	5.5	25.0
ASHBURNHWORCSL0011.002	1971	1971	1992	1990	54551	49356	1.7	10.9
ATHOL WORCSL0015.001	1959	1959	1993	1990	157544	143643	5.1	28.5
AUBURN WORCSL0017.002	1924	0	1950	1950	155677	155677	5.5	14.6
AUBURN WORCSL0017.001	1964	0	1990	1990	274439	274439	9.7	57.0
BARRE WORCSL0021.001	1904	0	1930	1930	155677	155677	5.5	9.8
BARRE WORCSL0021.002	1973	1973	1993	1990	443697	377143	13.3	85.2
BERLIN WORCSL0028.002	1949	0	1975	1975	155677	155677	5.5	24.0
BERLIN WORCSL0028.001	1958	0	1984	1984	21229	21229	0.8	3.9
BLACKSTOWORCSL0032.002	1947	0	1973	1973	155677	155677	5.5	23.1
BLACKSTOWORCSL0032.001	1972	1972	1996	1990	114915	86186	3.0	19.3
BOLTON WORCSL0034.001	1968	1968	1998	1990	41787	30644	1.1	6.6
BOLTON WORCSL0034.002	1945	0	1971	1971	155677	155677	5.5	26.5
BOYLSTONWORCSL0039.001	1970	1970	1991	1990	66710	63534	2.2	14.0
BOYLSTONWORCSL0039.002	1926	0	1952	1952	155677	155677	5.5	15.2
CHARLTONWORCSL0054.002	1977	1977	2001	1990	141433	76610	2.7	18.0
CLINTON WORCSL0064.001	1962	0	1988	1988	137820	137820	4.9	27.5
DUDLEY WORCSL0080.001	1980	0	2006	1990	368493	141728	5.0	34.2
EAST BROWORCSL0084.001	1962	0	1988	1988	20583	20583	0.7	3.5
FITCHBURWORCSL0097.004	1945	0	1971	1971	155677	155677	5.5	22.2
GARDNER WORCSL0103.002	1967	0	1993	1990	251243	222253	7.9	47.5
GRAFTON WORCSL0110.001	1961	0	1987	1987	137296	137296	4.9	26.9
HARDWICKWORCSL0124.001	1967	1967	1992	1990	41636	38305	1.4	8.2
HARVARD WORCSL0125.001	1958	0	1984	1984	106143	106143	3.8	19.6
HOLDEN WORCSL0134.002	1926	0	1952	1952	155677	155677	5.5	15.2
HOLDEN WORCSL0134.001	1961	0	1987	1987	129220	129220	4.6	25.3

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HOLDEN  WORCSL0134.001 1961    0 1987 1987  129220  129220   4.6  25.[illegible]
HOPEDALEWORCSL0138.001 1961    0 1987 1987  169601  169601   6.0  33.[illegible]
HOPEDALEWORCSL0138.003 1944    0 1970 1970  155677  155677   5.5  21.7
HUBBARDSWORCSL0140.001 1970 1970 1990 1990   19152   19152   0.7   4.2
HUBBARDSWORCSL0140.003 1929    0 1955 1955  155677  155677   5.5  16.1
HUBBARDSWORCSL0140.002 1942    0 1968 1968  155677  155677   5.5  20.9
LEICESTEWORCSL0151.001 1972 1972 1991 1990   90056   85316   3.0  19.1
LEICESTEWORCSL0151.002 1961    0 1987 1987   96915   96915   3.4  19.0
LEOMINSTWORCSL0153.003 1960    0 1986 1986   77762   77762   2.7  14.9
LUNENBURWORCSL0162.001 1975    0 2001 1990  200052  115415   4.1  26.6
MENDON  WORCSL0179.001 1949    0 1975 1975  155677  155677   5.5  23.5
MILFORD WORCSL0185.001 1949    0 1975 1975  155677  155677   5.5  23.5
MILLBURYWORCSL0186.001 1961    0 1987 1987  193829  193829   6.9  37.9
        TOTAL                                              176.6 872.0
        ST.TOTAL                                            2087 11737
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LANDFILL NMOC EMISSIONS 1990 BY EMISSION FACTOR AND LANDFILL MODEL (LAEM) -SORTED BY COUNTIES

ref2:Montague-end

TOWN	COUN	ID	EST OPEN BASE	ACT OPEN BASE	ACT CLOSE BASE	CURR/ CLOS YEAR	ESTIM DESIGN CPCITY TONS	1990 TOTAL REFUS TONS	EF 35.4 NMOC TONS 1990	LAEM NMOC TONS 1990
ABINGTON	PLYM	SL0001.003	1949	0	1975	1975	155677	155677	5.5	SAMPLE
ACTON	MIDD	SL0002.003	1962	0	1988	1988	214406	214406	7.6	SAMPLE
MONTAGUE	FRAN	SL0192.001	1967	0	1993	1990	154832	136967	4.8	SAMPLE
ORLEANS	BARN	SL0224.001	1966	0	1992	1990	107892	99593	3.5	21.1
PROVINCET	BARN	SL0242.002	1964	0	1990	1990	80440	80440	2.8	16.7
SANDWICH	BARN	SL0261.002	1964	0	1990	1990	210677	210677	7.4	43.8
TRURO	BARN	SL0300.001	1964	0	1990	1990	47881	47881	1.7	10.0
WELLFLEET	BARN	SL0318.001	1966	0	1992	1992	57457	57457	2.0	12.2
YARMOUTH	BARN	SL0351.005	1968	0	1994	1990	568141	480735	17.0	103.6
YARMOUTH	BARN	SL0351.003	1941	0	1967	1967	155677	155677	5.5	20.5
	TOT								40.0	227.7
MONTEREY	BERK	SL0193.001	1955	0	1981	1981	19152	19152	0.7	33.2
NEW ASHFO	BERK	SL0200.001	1964	0	1990	1990	155677	155677	5.5	32.3
NEW MARLB	BERK	SL0203.003	1955	0	1981	1981	155677	155677	5.5	26.5
NORTH ADA	BERK	SL0209.003	1966	0	1992	1990	394221	363896	12.9	77.0
RICHMOND	BERK	SL0249.001	1944	0	1970	1970	155677	155677	5.5	21.7
SAVOY	BERK	SL0263.001	1965	0	1991	1990	7551	7261	0.3	1.5
SHEFFIELD	BERK	SL0267.002	1951	0	1977	1977	155677	155677	5.5	31.0
STOCKBRID	BERK	SL0283.003	1964	0	1990	1990	766	766	0.0	15.9
WASHINGTO	BERK	SL0313.001	1951	0	1977	1977	1090	1090	0.0	17.4
WILLIAMST	BERK	SL0341.006	1947	0	1973	1973	155677	155677	5.5	23.1
WILLIAMST	BERK	SL0341.008	1968	0	1994	1990	183982	155677	5.5	33.6
WINDSOR	BERK	SL0345.002	1963	0	1989	1989	9221	9221	0.3	1.9
	TOT								47.2	315.1
NEW BEDFO	BRIS	SL0201.004	1929	0	1955	1955	155677	155677	5.5	19.7
NEW BEDFO	BRIS	SL0201.003	1964	0	1990	1990	155677	155677	5.5	32.3
NEW BEDFO	BRIS	SL0201.001	1966	0	1992	1990	3031022	2797866	98.9	591.9
NORTH ATT	BRIS	SL0211.001	1978	1978	2006	1990	634268	271829	9.6	64.4
NORTON	BRIS	SL0218.002	1964	0	1990	1990	172448	172448	6.1	35.8
RAYNHAM	BRIS	SL0245.003	1950	0	1976	1976	155677	155677	5.5	24.5
RAYNHAM	BRIS	SL0245.001	1976	1976	1997	1990	158008	105338	3.7	24.5
REHOBOTH	BRIS	SL0247.003	1974	1974	1996	1990	144840	105338	3.7	24.0
SEEKONK	BRIS	SL0265.001	1963	0	1989	1989	113643	113643	4.0	23.1
SOMERSET	BRIS	SL0273.001	1960	0	1986	1986	155677	155677	5.5	29.9
TAUNTON	BRIS	SL0293.002	1967	0	1993	1990	604828	535040	18.9	114.2
WESTPORT	BRIS	SL0334.002	1964	0	1990	1990	99593	99593	3.5	20.7
	TOT								171	1004.9
OAK BLUFF	DUKE	SL0221.001	1970	0	1996	1990	65599	50461	1.8	11.1
TISBURY	DUKE	SL0296.002	1966	0	1992	1990	45137	41665	1.5	8.8
WEST TISB	DUKE	SL0327.001	1964	0	1990	1990	17143	17143	0.6	3.6
	TOT								3.9	23.5

NEWBURY	ESSESL0205.002	1960	1960	1994	1990	71364	62968	2.2	12.6
NEWBURYPO	ESSESL0206.001	1960	0	1986	1986	220210	220210	7.8	42.2
PEABODY	ESSESL0229.001	1967	0	1993	1990	2833907	2506918	88.6	535.3
ROCKPORT	ESSESL0252.002	1962	0	1988	1988	85762	85762	3.0	17.1
ROWLEY	ESSESL0254.003	1958	1958	1991	1990	57278	55542	2.0	10.9
SALEM	ESSESL0258.001	1962	0	1988	1988	155677	155677	5.5	31.1
SALISBURY	ESSESL0259.001	1966	0	1992	1990	89218	82356	2.9	17.4
SAUGUS	ESSESL0262.007	1938	1938	1985	1985	155677	155677	5.5	24.3
SAUGUS	ESSESL0262.002	1961	0	1987	1987	155677	155677	5.5	30.5
SAUGUS	ESSESL0262.004	1962	0	1988	1988	155677	155677	5.5	31.1
SWAMPSCOT	ESSESL0291.002	1912	0	1938	1938	155677	155677	5.5	11.5
TOPSFIELD	ESSESL0298.002	1971	1971	2001	1990	157252	99593	3.5	22.1
WEST NEWB	ESSESL0324.001	1960	0	1986	1986	30305	30305	1.1	5.8
	TOT							139	791.9
ORANGE	FRANSL0223.003	1965	0	1991	1990	100425	96562	3.4	20.2
SUNDERLAN	FRANSL0289.003	1966	0	1992	1990	168650	155677	5.5	32.9
WARWICK	FRANSL0312.001	1972	71	1998	1990	16252	11251	0.4	2.5
								9.3	55.7
CHICOPEE	HAMPSL0061.006	1965	0	1991	1990	161904	155677	5.5	32.6
HOLYOKE	HAMPSL0137.006	1965	0	1991	1990	161904	155677	5.5	32.6
PALMER	HAMPSL0227.001	1966	0	1992	1990	202285	186724	6.6	39.5
SOUTHWICK	HAMPSL0279.002	1950	0	1976	1976	155677	155677	5.5	24.5
SPRINGFIE	HAMPSL0281.003	1944	0	1970	1970	155677	155677	5.5	21.7
WESTFIELD	HAMPSL0329.002	1924	0	1950	1950	155677	155677	5.5	14.6
WESTFIELD	HAMPSL0329.001	1966	0	1992	1990	1045121	964727	34.1	204.1
WILBRAHAM	HAMPSL0339.002	1945	0	1971	1971	155677	155677	5.5	22.2
WILBRAHAM	HAMPSL0339.001	1965	0	1991	1990	149389	143643	5.1	30.1
	TOT							78.8	421.9
CHESTERFI	HAMPSL0060.002	1963	0	1989	1989	155677	155677	5.5	31.7
HADLEY	HAMPSL0117.003	1959	0	1985	1985	155677	155677	5.5	29.3
NORTHAMPT	HAMPSL0214.001	1967	0	1993	1990	548047	484811	17.1	103.5
SOUTH HAD	HAMPSL0275.001	1965	1965	1992	1990	364547	337544	11.9	70.8
SOUTHAMPT	HAMPSL0276.001	1971	1971	2001	1990	76233	48281	1.7	10.7
WARE	HAMPSL0309.001	1967	0	1993	1990	687473	608150	21.5	129.9
WESTHAMPT	HAMPSL0331.001	1971	0	1997	1990	27084	19792	0.7	4.4
WORTHINGT	HAMPSL0349.001	1964	0	1990	1990	155677	155677	5.5	3.2
	TOT							69.5	383.4
MALDEN	MIDDSL0165.004	1934	0	1960	1960	155677	155677	5.5	17.8
NATICK	MIDDSL0198.001	1969	0	1995	1990	521676	421354	14.9	91.7
NEWTON	MIDDSL0207.003	1962	0	1988	1988	155677	155677	5.5	31.1
NEWTON	MIDDSL0207.001	1962	0	1988	1988	155677	155677	5.5	31.1
NEWTON	MIDDSL0207.005	1949	0	1975	1975	155677	155677	5.5	24.0
NORTH REA	MIDDSL0213.001	1942	0	1968	1968	155677	155677	5.5	29.9
PEPPERELL	MIDDSL0232.001	1976	1976	1992	1990	109443	95762	3.4	22.3
SHERBORN	MIDDSL0269.001	1961	0	1987	1987	46842	46842	1.7	9.2
SHIRLEY	MIDDSL0270.001	1966	0	1992	1990	93368	86186	3.0	18.2
STONEHAM	MIDDSL0284.001	1944	0	1970	1970	155677	155677	5.5	26.5
STONEHAM	MIDDSL0284.002	1920	0	1946	1946	155677	155677	5.5	13.5
STOW	MIDDSL0286.002	1961	0	1987	1987	155677	155677	5.5	30.5
SUDBURY	MIDDSL0288.001	1967	0	1993	1993	211524	211524	7.5	45.2
SUDBURY	MIDDSL0288.003	1944	0	1970	1970	155677	155677	5.5	21.7

SUDBURY	MIDDSL0288.003	1944	0	1970	1970	155677	155677	5.5	21.7
TEWKSBURY	MIDDSL0295.002	1931	0	1957	1957	155677	155677	5.5	16.8
TEWKSBURY	MIDDSL0295.001	1931	0	1957	1957	155677	155677	5.5	16.8
TOWNSEND	MIDDSL0299.002	1978	1978	1991	1990	93368	86186	3.0	20.4
TYNGSBORO	MIDDSL0301.001	1958	0	1984	1984	155677	155677	5.5	28.7
WALTHAM	MIDDSL0308.001	1963	0	1989	1989	155677	155677	5.5	31.7
WALTHAM	MIDDSL0308.002	1948	0	1974	1974	155677	155677	5.5	23.5
WATERTOWN	MIDDSL0314.003	1930	0	1956	1956	155677	155677	5.5	16.5
WATERTOWN	MIDDSL0314.002	1935	0	1961	1961	155677	155677	5.5	18.2
WAYLAND	MIDDSL0315.004	1975	0	2001	1990	597556	344744	12.2	79.4
WESTFORD	MIDDSL0330.001	1959	0	1985	1985	113220	113220	4.0	21.3
WESTON	MIDDSL0333.001	1962	0	1988	1988	125213	125213	4.4	25.0
WILMINGTO	MIDDSL0342.003	1950	0	1976	1976	155677	155677	5.5	24.5
WOBURN	MIDDSL0347.001	1961	0	1987	1987	401540	401540	14.2	78.6
	TOT							162	813.6
NANTUCKET	NANTSL0197.001	1940	1940	2003	1990	293365	232829	8.2	39.2
	TOT								
NEEDHAM	NORFSL0199.001	1969	0	1995	1990	505203	408049	14.4	88.8
NORFOLK	NORFSL0208.001	1983	1983	1992	1990	98498	76610	2.7	19.0
NORWOOD	NORFSL0220.002	1962	0	1988	1988	363632	363632	12.9	72.6
PLAINVILL	NORFSL0238.002	1974	1974	1995	1990	7823382	5960672	211	1359.0
QUINCY	NORFSL0243.001	1961	0	1987	1987	1041833	1041833	36.8	203.8
RANDOLPH	NORFSL0244.001	1968	0	1994	1990	784301	663639	23.5	143.0
SHARON	NORFSL0266.001	1959	0	1985	1985	287287	287287	10.2	54.0
STOUGHTON	NORFSL0285.001	1950	0	1976	1976	155677	155677	5.5	24.5
WALPOLE	NORFSL0307.005	1954	0	1980	1980	155677	155677	5.5	26.5
WELLESLEY	NORFSL0317.001	1949	0	1975	1975	155677	155677	5.5	24.0
WEYMOUTH	NORFSL0336.003	1939	0	1965	1965	155677	155677	5.5	19.7
	TOT							333	2034.8
NORWELL	PLYMSL0219.003	1950	0	1976	1976	155677	155677	5.5	24.5
PEMBROKE	PLYMSL0231.001	1979	1979	1992	1990	124491	105338	3.7	25.2
PLYMOUTH	PLYMSL0239.001	1967	0	1993	1990	1407288	1244909	44.0	265.8
PLYMOUTH	PLYMSL0239.003	1964	0	1990	1990	155677	155677	5.5	32.3
ROCHESTER	PLYMSL0250.001	1964	0	1990	1990	76610	76610	2.7	15.9
ROCKLAND	PLYMSL0251.001	1967	0	1993	1990	434142	384049	13.6	82.0
ROCKLAND	PLYMSL0251.002	1950	0	1976	1976	155677	155677	5.5	24.5
SCITUATE	PLYMSL0264.001	1975	1975	1996	1990	536268	383049	13.5	88.2
WAREHAM	PLYMSL0310.001	1947	0	1973	1973	155677	155677	5.5	23.1
WEST BRID	PLYMSL0322.001	1961	0	1987	1987	64610	64610	2.3	12.6
WHITMAN	PLYMSL0338.001	1949	0	1975	1975	155677	155677	5.5	24.0
	TOT							107	618.0
DOUGLAS	WORCSL0077.005	1961	0	1987	1987	72686	72686	2.6	14.2
NORTH BRO	WORCSL0212.003	1914	0	1940	1940	155677	155677	5.5	12.0
NORTH BRO	WORCSL0212.001	1964	0	1990	1990	47881	47881	1.7	9.9
NORTH BRO	WORCSL0212.004	1904	0	1930	1930	155677	155677	5.5	9.8
NORTHBORO	WORCSL0215.002	1934	0	1960	1960	155677	155677	5.5	17.8
NORTHBRID	WORCSL0216.001	1962	0	1988	1988	128643	128643	4.5	25.7
OAKHAM	WORCSL0222.001	1965	0	1991	1990	11951	11491	0.4	2.4
OXFORD	WORCSL0226.002	1961	0	1987	1987	113067	113067	4.0	22.1
PAXTON	WORCSL0228.002	1944	0	1970	1970	155677	~~155~~677	5.5	21.7
PRINCETON	WORCSL0241.001	1944	0	1970	1970	155677	155677	5.5	21.7

APPENDIX

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PRINCETONWORCSL0241.002 1962    0 1988 1988   25729   25729  0.9    5.1
ROYALSTONWORCSL0255.001 1969    0 1995 1990  196457  158677  5.6   34.5
RUTLAND  WORCSL0257.001 1945    0 1971 1971  155677  155677  5.5   22.2
RUTLAND  WORCSL0257.002 1971 1971 1989 1989   40381   40381  1.4    8.9
SHREWSBURWORCSL0271.001 1962    0 1988 1988  155677  155677  5.5   31.1
SOUTHBOROWORCSL0277.002 1950    0 1976 1976  155677  155677  5.5   24.5
SOUTHBOROWORCSL0277.003 1927    0 1953 1953  155677  155677  5.5   15.5
SOUTHBRIDWORCSL0278.001 1931    0 1957 1957  155677  155677  5.5   18.8
SOUTHBRIDWORCSL0278.002 1980 1980 2000 1990  383049  191524  6.8   46.2
SOUTHBRIDWORCSL0278.003 1946    0 1972 1972  155677  155677  5.5   22.6
SPENCER  WORCSL0280.005 1961    0 1987 1987  104991  104991  3.7   20.5
STERLING WORCSL0282.001 1971 1971 1990 1990   67034   67034  2.4   14.9
STURBRIDGWORCSL0287.001 1970 1970 2000 1990  100550   67034  2.4   14.7
STURBRIDGWORCSL0287.005 1947    0 1973 1973  155677  155677  5.5   23.1
SUTTON   WORCSL0290.002 1972 1972 1995 1990   85654   67034  2.4   15.0
TEMPLETONWORCSL0294.001 1954    0 1980 1980  155677  155677  5.5   26.5
TEMPLETONWORCSL0294.002 1934    0 1960 1960  155677  155677  5.5   17.8
TEMPLETONWORCSL0294.003 1964    0 1990 1990   95762   95762  3.4   19.9
UXBRIDGE WORCSL0304.001 1962    0 1988 1988   85762   85762  3.0   17.1
WARREN   WORCSL0311.001 1950 1950 1990 1990   47881   47881  1.7    8.8
WEBSTER  WORCSL0316.001 1962    0 1988 1988  428811  428811 15.2   85.6
WEST BOYLWORCSL0321.001 1960    0 1986 1986   60610   60610  2.1   11.6
WEST BROOWORCSL0323.001 1978 1978 1993 1990   47881   38305  1.4    9.1
WESTBOROUWORCSL0328.001 1964    0 1990 1990  605230  605230 21.4  125.7
WESTMINSTWORCSL0332.001 1970    0 1996 1990 1075227  827098 29.2  181.6
WINCHENDOWORCSL0343.001 1966    0 1992 1990   82994   76610  2.7   16.2
WORCESTERWORCSL0348.004 1959    0 1985 1985 2094562 2094562 74.1  393.7
         TOT                                                 270 1388.6

         TOTAL REF2                                         1439   8118
         TOTAL REF1                                         2087  11737
         TOTAL STATE                                        3526  19856
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PLANTS WITH SIC: 7216 - DRY CLEANING PLANTS

CITY	PLANT NAME	AQCR	PLNT	DTR1	#EMP	VOC
ADAMS	ADAMS LNDRY&DRY CLNG	117	0173	891231	NF	1
AYER	KLEENIT INC.	121	0904	851231	14	4
BOSTON	ASHMONT CLEANERS	119	1495	861231	5	2
BOSTON	CLASSIC CLEANERS	119	1453	831231	4	0
BOSTON	CONGRESS CLEANERS	119	1454	861231	5	5
BOSTON	CONTINENTAL CLEANERS	119	1776	831231	NF	4
BOSTON	COTTAGE CLEANERS	119	1794		~~0~~ NF	0
BOSTON	FRANKIE'S CLEANERS	119	1786	861231	6	4
BOSTON	GOLD CROWN CLEANERS	119	1675	861231	5	5
BOSTON	HANS CLNRS/DBA SID'S	119	1718	861231	NF	7
BOSTON	M&M CLEANERS	119	1569	861231	5	8
BOSTON	MASTER CLEANERS	119	1782	831231	NF	2
BOSTON	NEW MODEL CLEANERS	119	1725	831231	NF	2
BOSTON	PILGRIM LAUNDRY, 65	119	0067	861231	NF	0
BOSTON	PRUDENTIAL CLEAN.INC	119	1561	861231	NF	8
BOSTON	SARNI ORIG.DRY CLEAN	119	1428	901231	12	3
BOSTON	SYMPHONY CLEANERS IN	119	1660	831231	NF	2
BOSTON	VIN'S CLEANERS	119	1715	861231	NF	1
BROOKLINE	VILLAGE CLEANERS	119	1429		NF	0
CAMBRIDGE	CITY EXPRESS	119	1539	831231	8	3
CAMBRIDGE	CRIMSON CLEANERS	119	1543	831231	5	3
CAMBRIDGE	RITE WAY CLEANERS	119	1444	831231	NF	8
FALL RIVER	SLADE LAUNDRY INC.	120	0857	831231	31	0
HINGHAM	TWIN CITY CLEANERS	119	0103	891231	5	1
HOLBROOK	AVENI CLEANERS	119	1117	871231	30	0
HOLYOKE	GENERAL DRIVE IN CLN	042	0167	861231	35	0
HOLYOKE	HERMANN BOSBACH INC	042	0162	901231	10	5
HOLYOKE	HOLIDAY CLEANERS	042	0169	861231	6	0
MALDEN	EASTERN CLEANERS COR	119	1699	831231	NF	0
MALDEN	FREEMAN CLEANERS	119	1702	831231	NF	0
MALDEN	HULSCHERS DRY CLEANE	119	1701	831231	NF	0
MALDEN	LA SALLE CLEANERS	119	1700	831231	NF	0
MEDFORD	BONANNO RENTAL SYST.	119	0788	861231	NF	0
MEDFORD	NU WAY CLEANERS INC.	119	7181	831231	NF	1
MEDFORD	RIVERSIDE CLEANERS	119	1690	831231	6	0
MEDFORD	ROYAL INSTITUTIONAL	119	0258	901231	NF	0
MEDFORD	VAL'S CLEANERS	119	1691	831231	1	0
MILTON	CENTRAL CLEANERS INC	119	0195	831231	NF	5
NEWTON	HOLLY CLEANERS INC	119	0376	831231	10	3
NEWTON	ORCHID CLEANER&LAUND	119	0163	811231	NF	0
NEWTON	SARNI CLEANERS INC.	119	0386	861231	15	1
NORTH ADAMS	TREET CLEANERS	117	0161	861231	NF	0
PITTSFIELD	STETSON SANITONE CLN	117	0159	871231	15	0
QUINCY	DEPENDABLE LAUNDERER	119	1654	861231	11	1
QUINCY	DEPENDABLE LAUNDERER	119	1649	861231	25	7
QUINCY	DEPENDABLE LAUNDERER	119	1652	861231	18	1
QUINCY	FREEPORT CLEANERS	119	1648	861231	3	4
RANDOLPH	NO. RANDOLPH CLEANER	119	0230	811231	4	0
REVERE	HANDY CLEANERS	119	1693	831231	1	0
SOMERVILLE	ROYAL INSTITUTIONAL	119	0794	901231	NF	0
SOMERVILLE	SHEA DRY CLEANERS	119	1790	831231	20	5

TOTAL PLANTS: 51 EMPLOYEES: 17773 VOC: 106

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DEGREASING VOC EMISSIONS BY SIC CODES 1990

SIC	PLANT NAME	TOWN	COUNTY	PLANT EMPLOY	PLANT VOC
2500	WATERCRAFT	GREENFLD	FRANK	495	12
2511	COUNTRY RIV	AMESBURY	ESSEX	66	32
2511	R & G MANUF	AMESBURY	ESSEX	90	66
2511	ER BUCK CHAIR	CLINTON	WORC	15	15
2511	MODERN CONTR	GARDNER	WORC	150	23
2511	NICH & STONE	GARDNER	WORC	200	96
2511	S.BENT BR	GARDNER	WORC	165	75
2512	HARTSHORNE	GARDNER	WORC	48	10
2512	PLYCRAFT	LAWRENCE	ESSEX	40	14
2514	WEHSCO	STOUGHTON	NORF	495	21
2531	ADDEN FARM	LOWELL	MDSX	140	48
2541	STORETECH	F.RIVER	BRIST	60	10
3316	TELEDYNE	N.BEDFRD	BRIST	380	20
3321	LE BARON	BROCKTON	PLYM	89	29
3325	WALLOSTON ALL	BRAINTREE	NORF	170	50
3351	IBC CORP	EASTON	BRIST	24	16
3355	SILVER CITY	TAUNTON	BRIST	60	25
3356	STERN LEACH	ATLEBORO	BRIST	495	26
3357	DELTA SUPR	CLINTON	WORC	378	25
3357	INDEP CABLE	HUDSON	MDSX	90	11
3399	CHEMET	ATTLE	BRIST	35	27
3399	INDUS HEAT	QUINCY	NORF	50	15
3411	CROWN CORK	LAWRENCE	ESSEX	205	233
3411	ROCHE BR	LOWELL	MDSX	3000	26
3421	GILLETTE	BOSTON	SUFF	43	26
3425	AMER SAW	E.LONGM	HAMPD	72	43
3433	MESTEK	WESTFIELD	HAMPD	495	20
3442	RUBBAIR	AYER	MDSX	35	17
3444	MC KINSTRY	CHICOPEE	HAMPD	67	19
3444	BME ENG	GEORGETOWN	ESSEX	76	30
3451	INNER TITE	HOLDEN	WORC	70	18
3462	WYMAN GORDON	WORC	WORC	417	23
3469	LARSON TOOL	ATTLE	BRIST	120	33
3469	PETER GRAY	CAMBRIDGE	MDSX	23	12
3469	ALUM PROC	F.RIV	BRIS	640	99
3469	REFLEK	F.RIV	BRIS	140	12
3469	PCI	N.BEDF	BRIS	235	60
3469	NATIONAL MET	W.SPR	HAMPD	100	42
3471	CAMBR PLAT	BELMONT	MDSX	41	34
3471	MODERN ELECTRO	BOST	SUFF	52	16
3471	MUELLER CP	E.BRIDGEW	PLYM	45	10
3471	SUPERIOR PROC	FRAMINGH	MDSX	40	26
3479	TEK COAT	AMESBURY	ESSX	35	13
3479	NYES JAP	CHELMSFORD	MDSX	50	18
3479	EASTON ETCH	CHICOP	HAMPD	150	41
3479	CONGRESS TECH	DRACUT	MDSX	16	16
3479	DUNCAN GALV.	EVERRET	MDSX	45	25
3479	EASTERN PROC	HINGHAM	PLYM	20	11
3479	CHEMI GRAPH	LUDLOW	HAMPD	45	11
3479	FEELEYS ENAMEL	QUINCY	NORF	20	20
3479	ANDERSON &SONS	WESTFIELD	HAMPD	68	34
3479	WOBURN STEEL	WOBURN	MDSX	16	35
3483	CHAMBERLAIN MFG	N.BEDF	BRIS	350	29

3484	SMITH & WESSON	SPFLD	HAMPD	1850	15
3494	AUTOMATIC MACH	ATTLE	BRIS	259	11
3497	FOILMARK	NBPORT	ESSX	79	68
3499	BURTMAN IRON	BOST	SUFF	9	27
3499	FINISHIELD CP	LOWELL	MDSX	19	14
3499	ZERO CP	MONSON	HAMPD	265	23
3499	STURDY LANT	N ATTLE	BRIS	105	14
3499	HODGE MFG	SPFLD	HAMPD	40	26
3499	PRESSNET CP	WORC	WORC	300	20
3499	WRIGHT LINE	WORC	WORC	244	43
3535	WEBB	COHASSET	NORF	123	25
3545	L S STARRET	ATHOL	WORC	1000	65
3552	HOWARD BR	AUBURN	WORC	50	17
3552	ASHWORTH BR	F.RIV	BRIS	95	28
3552	ENTWISTLE	HUDSON	MDSX	160	16
3555	COMPUGRAPHIC	WILMINGTON	MDSX	30	12
3559	WATERTOWN	IONICS	MDSX	270	42
3573	CONSOL COAT	BELLINGAM	NORF	16	22
3573	DIGITAL EQ	WESTFIELD	HAMPD	1200	16
3589	INTER DRYER	N.BEDF	BRIS	73	16
3612	GE	PITTSFIELD	BERK	200	31
3622	TEXAS INST	ATTLE	BRIS	5000	126
3641	GTE	DANVERS	ESSX	593	35
3641	PHILLIPS LT	LYNN	ESSX	495	86
3641	NORWELL MFG	TAUNTON	BRIS	150	12
3644	MAGNESIUM CAST	BOSTON	SUFF	260	34
3646	LITE CONTROL	HANSON	PLYM	155	24
3646	KCP GENLYTE	WILMINGTON	MDSX	250	19
3648	LEE PROD	EVERRET	MDSX	40	25
3661	AT & T	N.ANDOVER	ESSX	6321	95
3662	CRAIG SYST	AMESBURY	ESSX	225	27
3662	GTE GOVT	NEEDHAM	NORF	1250	36
3673	DIGITAL	HUDSON	MDSX	2003	20
3674	SILICON TRANS	CHELMSFRD	MDSX	180	19
3675	CORNELL DUB	N.BEDF	BRIS	300	36
3675	COMMONW SPRAGUE	N.ADAMS	BERK	150	45
3675	SPRAGUE EL	N.ADAMS	BERK	334	22
3675	ALLEGRO	WORC	WORC	200	55
3679	RAYTHEON	ANDOVER	ESSX	6000	34
3679	BASF	BEDFRD	MDSX	730	404
3679	ECC CORP	HOLDEN	WORC	200	10
3679	PARLEX	METHUEN	ESSX	310	10
3679	AEROVOX	N.BEDF	BRIS	800	145
3679	KILBURN GLASS	NORTON	BRIS	495	11
3679	RAYTHEON	WALTHAM	MDSX	3274	26
3679	UNITRODE	WATERTOWN	MDSX	17	17
3679	PRINTED CIRC	WOBURN	ESSX	207	10
3732	BOSTON WHALER	ROCKLAND	PLYM	250	28
3751	COLUMBIA MFG	WESTFIELD	HAMPD	300	65
3761	RAYTHEON	LOWELL	MDSX	3200	51
3822	FENWALL	ASHLAND	MDSX	500	21
3829	SIMPLEX	GARDNER	WORC	400	18
3841	HEWLET PACK	ANDOVER	ESSX	1130	13
3841	CR BARD	BILLERICA	MDSX	500	15
3841	MICRON MEDIC	FITCHBURG	WORC	26	16
3841	INTERNAT EQP	NEEDHAM	NORF	168	22
3861	POLAROID	FREETOWN	BRIS	90	66
3861	POLAROID	N.BEDF	BRIS	500	26
3861	POLAROID	NORWOOD	NORF	1537	24
3861	POLAROID	WALTHAM	MDSX	383	383

3911	LG BALFOUR	ATTLEB	BRIS	600	12
3911	AMER OPTIC	S.BRIDGE	WORC	1300	36
3914	TOWLE MFG	NBPORT	ESSX	495	11
3944	MILTON BRADLEY	E.LONGM	HAMPD	1625	61
3949	ACUSHNET A	ACUSHNET	BRIS	1170	92
3949	SPALDING	CHICOP	HAMPD	1000	85
3961	SWANK	ATTLE	BRIS	640	30
3961	WHITING & DAVIS	PLAINVILLE	NORF	300	13
3993	GILTSPUR	AVON	NORF	145	12
3995	FLORENCE CASK	N.ATTLE	HAMPSH	55	34
3499	SPFLD WIRE	SPFLD	HAMPD	267	17
417	NO SOURCES REPORTED FOR THIS SIC			0	0
423	NO SOURCES REPORTED FOR THIS SIC			0	0
551	NO SOURCES REPORTED FOR THIS SIC			0	0
552	NO SOURCES REPORTED FOR THIS SIC			0	0
554-6	NO SOURCES REPORTED FOR THIS SIC			0	0
753	MAACO AUTO		HAMPD	8	6
1128	CW KNIGHT		NORF	22	9
				63403	4818
			AVG EMP	495	

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TABLE B.3-3

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DEGREASING VOC EMISSIONS BY COUNTY 1990

SIC	PLANT NAME	TOWN	COUNTY	PLANT EMPLOY	PLANT VOC
3675	SPRAGUE EL	N.ADAMS	BERK	334	22
3675	COMMONW SPRAGUE	N.ADAMS	BERK	150	45
3612	GE	PITTSFIELD	BERK	200	31
				684	98
3949	ACUSHNET A	ACUSHNET	BRIS	1170	92
3961	SWANK	ATTLE	BRIS	640	30
3622	TEXAS INST	ATTLE	BRIS	5000	126
3494	AUTOMATIC MACH	ATTLE	BRIS	259	11
3911	LG BALFOUR	ATTLEB	BRIS	600	12
3861	POLAROID	FREETOWN	BRIS	90	66
3469	REFLEK	F.RIV	BRIS	140	12
3552	ASHWORTH BR	F.RIV	BRIS	95	28
3469	ALUM PROC	F.RIV	BRIS	640	99
3499	STURDY LANT	N ATTLE	BRIS	105	14
3679	KILBURN GLASS	NORTON	BRIS	495	11
3469	PCI	N.BEDF	BRIS	235	60
3675	CORNELL DUB	N.BEDF	BRIS	300	36
3589	INTER DRYER	N.BEDF	BRIS	73	16
3679	AEROVOX	N.BEDF	BRIS	800	145
3483	CHAMBERLAIN MFG	N.BEDF	BRIS	350	29
3861	POLAROID	N.BEDF	BRIS	500	26
3641	NORWELL MFG	TAUNTON	BRIS	150	12
3356	STERN LEACH	ATLEBORO	BRIST	495	26
3469	LARSON TOOL	ATTLE	BRIST	120	33
3399	CHEMET	ATTLE	BRIST	35	27
3351	IBC CORP	EASTON	BRIST	24	16
2541	STORETECH	F.RIVER	BRIST	60	10
3316	TELEDYNE	N.BEDFRD	BRIST	380	20
3355	SILVER CITY	TAUNTON	BRIST	60	25
				12816	982
2511	COUNTRY RIV	AMESBURY	ESSEX	66	32
2511	R & G MANUF	AMESBURY	ESSEX	90	66
3444	BME ENG	GEORGETOWN	ESSEX	76	30
2512	PLYCRAFT	LAWRENCE	ESSEX	40	14
3411	CROWN CORK	LAWRENCE	ESSEX	205	233
3479	TEK COAT	AMESBURY	ESSX	35	13
3662	CRAIG SYST	AMESBURY	ESSX	225	27
3679	RAYTHEON	ANDOVER	ESSX	6000	34
3841	HEWLET PACK	ANDOVER	ESSX	1130	13
3641	GTE	DANVERS	ESSX	593	35
3641	PHILLIPS LT	LYNN	ESSX	495	86
3679	PARLEX	METHUEN	ESSX	310	10
3497	FOILMARK	NBPORT	ESSX	79	68
3914	TOWLE MFG	NBPORT	ESSX	495	11
3661	AT & T	N.ANDOVER	ESSX	6321	95
3679	PRINTED CIRC	WOBURN	ESSX	207	10
				16367	777
2500	WATERCRAFT	GREENFLD	FRANK	495	12
753	MAACO AUTO		HAMPD	8	6
3479	EASTON ETCH	CHICOP	HAMPD	150	41
3949	SPALDING	CHICOP	HAMPD	1000	85
3444	MC KINSTRY	CHICOPEE	HAMPD	67	19

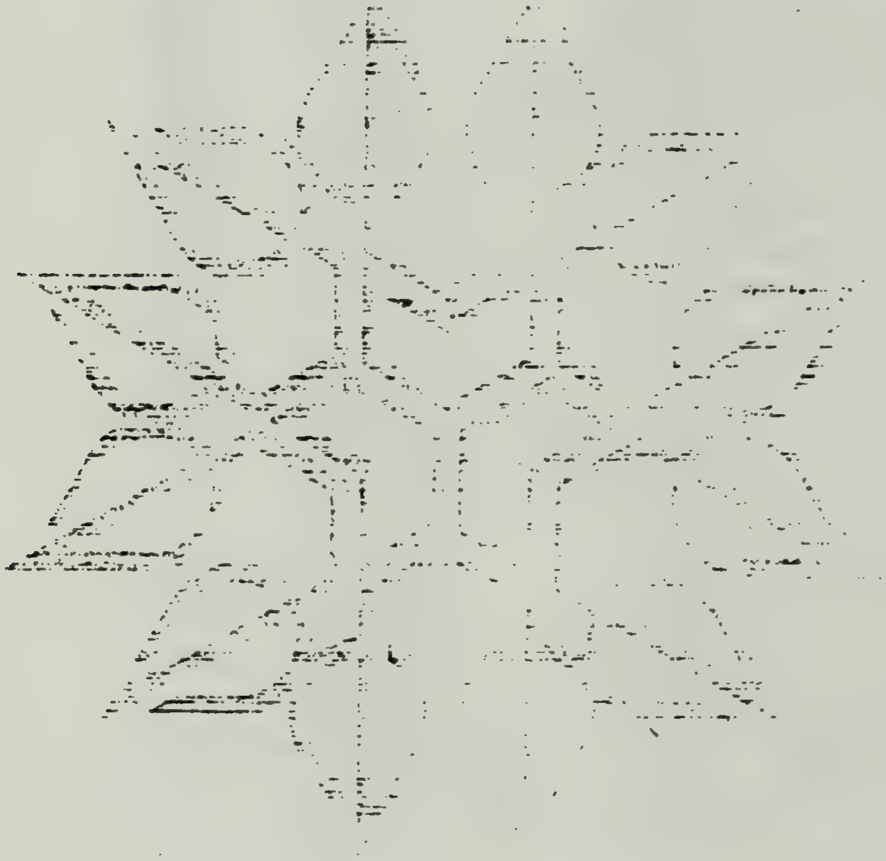
3944	MILTON BRADLEY	E.LONGM	HAMPD	1625	61
3425	AMER SAW	E.LONGM	HAMPD	72	43
3479	CHEMI GRAPH	LUDLOW	HAMPD	45	11
3499	ZERO CP	MONSON	HAMPD	265	23
3484	SMITH & WESSON	SPFLD	HAMPD	1850	15
3499	SPFLD WIRE	SPFLD	HAMPD	267	17
3499	HODGE MFG	SPFLD	HAMPD	40	26
3433	MESTEK	WESTFIELD	HAMPD	495	20
3479	ANDERSON &SONS	WESTFIELD	HAMPD	68	34
3751	COLUMBIA MFG	WESTFIELD	HAMPD	300	65
3573	DIGITAL EQ	WESTFIELD	HAMPD	1200	16
3469	NATIONAL MET	W.SPR	HAMPD	100	42
				7552	524
3995	FLORENCE CASK	N.ATTLE	HAMPSH	55	34
3822	FENWALL	ASHLAND	MDSX	500	21
3442	RUBBAIR	AYER	MDSX	35	17
3679	BASF	BEDFRD	MDSX	730	404
3471	CAMBR PLAT	BELMONT	MDSX	41	34
3841	CR BARD	BILLERICA	MDSX	500	15
3469	PETER GRAY	CAMBRIDGE	MDSX	23	12
3479	NYES JAP	CHELMSFORD	MDSX	50	18
3674	SILICON TRANS	CHELMSFRD	MDSX	180	19
3479	CONGRESS TECH	DRACUT	MDSX	16	16
3479	DUNCAN GALV.	EVERRET	MDSX	45	25
3648	LEE PROD	EVERRET	MDSX	40	25
3471	SUPERIOR PROC	FRAMINGH	MDSX	40	26
3552	ENTWISTLE	HUDSON	MDSX	160	16
3673	DIGITAL	HUDSON	MDSX	2003	20
3357	INDEP CABLE	HUDSON	MDSX	90	11
3559	WATERTOWN	IONICS	MDSX	270	42
3499	FINISHIELD CP	LOWELL	MDSX	19	14
2531	ADDEN FARM	LOWELL	MDSX	140	48
3411	ROCHE BR	LOWELL	MDSX	3000	26
3761	RAYTHEON	LOWELL	MDSX	3200	51
3679	RAYTHEON	WALTHAM	MDSX	3274	26
3861	POLAROID	WALTHAM	MDSX	383	383
3679	UNITRODE	WATERTOWN	MDSX	17	17
3646	KCP GENLYTE	WILMINGTON	MDSX	250	19
3555	COMPUGRAPHIC	WILMINGTON	MDSX	30	12
3479	WOBURN STEEL	WOBURN	MDSX	16	35
				15052	1352
1128	CW KNIGHT		NORF	22	9
3993	GILTSPUR	AVON	NORF	145	12
3573	CONSOL COAT	BELLINGAM	NORF	16	22
3325	WALLOSTON ALL	BRAINTREE	NORF	170	50
3535	WEBB	COHASSET	NORF	123	25
3662	GTE GOVT	NEEDHAM	NORF	1250	36
3841	INTERNAT EQP	NEEDHAM	NORF	168	22
3861	POLAROID	NORWOOD	NORF	1537	24
3961	WHITING & DAVIS	PLAINVILLE	NORF	300	13
3479	FEELEYS ENAMEL	QUINCY	NORF	20	20
3399	INDUS HEAT	QUINCY	NORF	50	15
2514	WEHSCO	STOUGHTON	NORF	495	21
				4296	269
3321	LE BARON	BROCKTON	PLYM	89	29
3471	MUELLER CP	E.BRIDGEW	PLYM	45	10
3646	LITE CONTROL	HANSON	PLYM	155	24
3479	EASTERN PROC	HINGHAM	PLYM	20	11
3732	BOSTON WHALER	ROCKLAND	PLYM	250	28

				559	102
3471	MODERN ELECTRO	BOST	SUFF	52	16
3499	BURTMAN IRON	BOST	SUFF	9	27
3644	MAGNESIUM CAST	BOSTON	SUFF	260	34
3421	GILLETTE	BOSTON	SUFF	43	26
				364	103
3545	L S STARRET	ATHOL	WORC	1000	65
3552	HOWARD BR	AUBURN	WORC	50	17
2511	ER BUCK CHAIR	CLINTON	WORC	15	15
3357	DELTA SUPR	CLINTON	WORC	378	25
3841	MICRON MEDIC	FITCHBURG	WORC	26	16
2511	MODERN CONTR	GARDNER	WORC	150	23
2512	HARTSHORNE	GARDNER	WORC	48	10
2511	S.BENT BR	GARDNER	WORC	165	75
3829	SIMPLEX	GARDNER	WORC	400	18
2511	NICH & STONE	GARDNER	WORC	200	96
3679	ECC CORP	HOLDEN	WORC	200	10
3451	INNER TITE	HOLDEN	WORC	70	18
3911	AMER OPTIC	S.BRIDGE	WORC	1300	36
3675	ALLEGRO	WORC	WORC	200	55
3499	PRESSNET CP	WORC	WORC	300	20
3462	WYMAN GORDON	WORC	WORC	417	23
3499	WRIGHT LINE	WORC	WORC	244	43
				5163	565
				63403	4818

Publication No. 86-2

APPENDIX B.3-4

Assessment of Agricultura Activities on Cropland in Massachusetts



Allen V. Barker
Jo-Ann C. Dery

The Environmental Institute
University of Massachusetts
at Amherst

Office Research and Standards
Massachusetts Department of
Environmental Quality Engin

Carrots:	50 to 75 lb nitrogen per acre at planting and 30 to 50 lb per acre sidedressed	15 to 40 lb phosphorus per acre at planting	25 to 60 lb potassium per acre at planting
Parsnips:	60 to 100 lb nitrogen per acre at planting and 30 lb per acre sidedressed	25 to 80 lb phosphorus per acre at planting	50 to 150 lb potassium per acre at planting

Sources:

New England Vegetable Growers Guide. 1984. Cooperative Extension Service, University of Massachusetts.

Ferguson, W. L. 1984. 1979 Pesticide Use on Vegetable Crops in Five Regions. ERS Staff Report No. AGES830920. National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia. This reference was the source of the ESTIMATED USE WITHIN CLASS.

Farm Chemicals Handbook '85. 1985. Meister Publishing Company, Willoughby, Ohio. (Chemical Names).

The Merck Index, Tenth Edition, 1983. Merck & Co., Inc. Rahway, New Jersey. (CAS Numbers).

Abbreviations:
PPI, preplant-incorporated
PRE, preemergence (to weeds) application
PEM, postemergence (to weeds) application

TOTAL application of pesticides is the total or range of total of all times of application.

CUCUMBER CHEMICAL INVENTORY

CROPPING ACTIVITY	FARM CHEMICAL CLASS	FARM CHEMICAL COMMON NAME	FARM CHEMICAL ACTIVE INGREDIENT	CAS NUMBER	APPLICATION					
					TIMES	METHOD	TOTAL lb/Acre	ESTIMATE CHEM USE % WITHIN CLASS		
Cucumber, Watermelon, Muskmelon	Herbicide	bensulide	S-(O-O-diisopropyl phosphorodithioate ester of N-(2-mercaptoethyl) benzenesulfonamide	86-50-0	1	PPI	5.0-6.0 5.5	50.6	2.783	3.765
	Herbicide	DCPA	Dimethyl tetrachloroterephalate	1861-32-1	1	PEM	6.0-9.0 7.5			
	Herbicide	dinoseb	2-(1-methylpropyl)-4,6-dinitrophenol	88-85-7	1	PPI	1.1-4.5 2.8			
	Herbicide	naptalam	N-1-Naphthylphthalamic acid	132-66-1	1	PPI with bensulide	2.0	49.1	0.982	
	Insecticide	azinophosmethyl	0,0-Diethyl-S-(4-oxo-3-H-1,2,3-benzotriazine-3-yl)-methyl-dithiophosphonate	86-50-0	Not recommended in 1984		0.5	15.8	0.099	
	Insecticide	carbaryl	1-naphthalenyl methylcarbamate	63-25-2	1 ~~1~~	spray ~~bait~~	1.0 ~~2~~	15.1	0.151	
	Insecticide	dicofol	1,1-Bis (p-Chlorophenyl)-2,2,2-trichloroethanol	115-32-2	1	spray	0.5			
	Insecticide	dimethoate	0,0-dimethyl S-(2-(methylamino)-2-oxoethyl) phosphorodithioate	60-51-5	1 or more	spray	0.5 each time			

APPENDIX B.3-4 (CONT'D.)

Insecticide	endosulfan	6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzodioxathiepin-3-oxide	15-29-7	1 or more	spray	0.5 ✓ each time	62.8	0.314
Insecticide	fenvalerate	Cyano(3-phenoxyphenyl)methyl-4-chloro alpha (1-methylethyl)-benzeneacetate	66827-38-1	1	spray	5.0-10.0 7.5		
Insecticide	malathion	Diethyl ((dimethoxyphosphino-thioyl)thio)butanedioate	121-75-5	1 or more	spray	0.5 ✓ each time		.5755
Insecticide	methomyl	Methyl N-((methylamino)carbonyl)oxy)ethanimidothioate	16752-77-5	1 or more	spray	0.7 ✓ each time		
Insecticide	methoxychlor	2,2-Bis (p-methoxyphenyl)-1,1,1-trichloroethane	72-43-5	1 or more	spray	1.0 ✓ each time		
Insecticide	oxamyl	Methyl 2-(dimethylamino)-N-(((methylamino)carbonyl)oxy)-2-oxoethanimidothioate	23135-22-0	1	spray	0.5-1.0 .75		
Insecticide	oxydemeton-methyl	S-(2-ethylsulfinyl)ethyl O,O-dimethyl phosphorothioate	301-2-2	1 or more	spray	0.5 ✓ each time		.0115
Insecticide	other					~~0.5~~	2.3	
Fungicide	benomyl	Methyl(1-((butylamino)carbonyl)-1H-benzimidazol-2-yl)carbamate	17804-35-2	1 or more	spray	0.12-0.5 .31 each time		0.0626
Fungicide	chlorothalonil	2,4,5,6-tetrachloro-1,3-benzenedicarbonitrile	1897-45-6	1 or more	spray	0.9-1.7 1.3 each time	74.8	1.0374
Fungicide	basic copper sulfate	cupric sulfate	7758-98-7	1	spray	2 ✓		

CUCUMBER PAGE 2

.0956

1.5066

CUCUMBER CHEMICAL INVENTORY

Fungicide	cupric hydroxide	cupric hydroxide	20427-59-2	1	spray	1.5-2.0 1.6		
Fungicide	dinocap	A mixture of 2,4-Dinitro-6-octylphenyl crotonate and 2,6-dinitro-4-octylphenyl crotonate	6119-92-2	1-4	spray	0.5 2.5 each time		
Fungicide	mancozeb	Contains 16% manganese, 2% zinc and 62% ethylenebisdithiocarbamate ion-manganese ethylenebisdithiocarbamate plus zinc ion	8018-01-7	1 or more	spray	1.6-2.4 2.0 each time	15.5	.31

3.765
0.5755
1.5066
5.8461/3
AV = 1.9487 lb/Acre

Fertilization:	75 to 100 lb nitrogen per acre at planting and 30 to 60 lb per acre sidedressed	30 to 80 lb phosphorus per acre at planting	60 to 169 lb potassium per acre at planting

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Sources:

New England Vegetable Growers Guide. 1984. Cooperative Extension Service, University of Massachusetts.

Ferguson, V. L. 1984. 1979 Pesticide Use on Vegetable Crops in Five Regions. ERS Staff Report No. AGES830920. National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia. This reference was the source of the ESTIMATED CHEMICAL USE.

Farm Chemicals Handbook '85. 1985. Meister Publishing Company, Willoughby, Ohio. (Chemical Names).

APPENDIX

The Merck Index, Tenth Edition. 1983. Merck & Co., Inc. Rahway, New Jersey. (CAS Numbers).

To: Stephanie MacLeod@BWSC RR@DEP Boston
Jeffrey Krukonis@BWSC RR@DEP Boston
Cc:
:
From: Kenneth santlal@BWP AQ@DEP Boston
Subject: SPILLS DATA
Date: Thursday, January 23, 1992 14:07:08 EST
Attach:
Certify: N
Forwarded by:

This is just to confirm my request for data for the following :

1. USTS
2. Petroleum Spills
3. Hazardous Waste Spills

My project involves the estimation of VOC or Hydrocarbon emissions released to the atmosphere for CY90. The data required for this estimation is the quantity and type of fuel/haz.material spilled for each county in Mass.

Thanks for your cooperation

APPENDIX

APPENDIX B.3-5 (CONT'D.)
HAZARDOUS SPILLS DATA 1990

Ch. #2 [illegible] [illegible] - Hampshire
#4 " " - Suffolk

Herbicide Spills for 1990

Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
ESSEX	0	1 10	0	0	0	0	0	0	0	0	0	10
HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	0	
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	0	
NORFOLK	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	0	1	0	0	0	0	0	0	0	0	0	
		10										10

APPENDIX

APPENDIX B.3-5 [illegible]T'D.)

Methylene Chloride Spills for 1990 Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
NORFOLK	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0

0

0

0

APPENDIX

APPENDIX B.3-5 (CONT'D.)

Mineral Spirits Spills for 1990 Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
ESSEX	0	0	0	0	0	0	0	1	0	0	0	5,000
PLYMOUTH	0	0	0	100 1	0	0	0	0	0	0	0	100
WORCESTER	1 1	10 1	0	0	0	0	0	0	0	0	0	11
TOTAL	1	1	0	1	0	0	0	1 5,000	0	0	0	5,000
	1	10		100				5,000			5,111	

APPENDIX

APPENDIX B.3-5 (C'D.)

Pa t Spills for 1990 Page 1 03/12/92

CO TY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	0	0	0	0	0	0	0	0	0	0	0
HAMPSHIRE	0	0	0	0	1 250	0	0	0	0	0	0	250
MIDDLESEX	0	0	0	1 100	0	0	0	0	0	0	0	100
NORFOLK	0	0	0	0	0	0	0	0	0	0	0	0
SUFFOLK	0	1 10	0	0	0	0	0	0	0	0	0	10
TOTAL	0	1	0	1	1	0	0	0	0	0	0	
		10		100	250						360	

APPENDIX

APPENDIX B.3-5 (CONT'D.)

Paint Thinner Spills for 1990 Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BERKSHIRE	0	0	0	0	0	0	0	0	0	0	0	0
ESSEX	0	0	0	0	0	0	0	0	0	0	0	0
FRANKLIN	0	0	0	0	0	0	0	0	0	0	0	0
HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	0	0
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	0	0
PLYMOUTH	0	0	0	0	0	0	0	0	0	0	0	0
SUFFOLK	0	1	0	0	0	0	0	0	0	0	0	10
WORCESTER	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	0	0	0	0	0	0	0	0	0	
		10										10

added to previous

APPENDIX

Perchloroethylene Spills for 1990 Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	0	0	0	0	0	0	0	0	0	0	0
ESSEX	0	1 10	0	0	0	0	0	0	0	0	0	10
HAMPSHIRE	0	0	0	1 100	0	0	0	0	0	0	0	100
HAMSTEAD	0	0	0	0	0	0	0	0	0	0	0	0
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	0	0
PLYMOUTH	0	1 10	0	0	0	0	0	0	0	0	0	10
SUFFOLK	0	1 10	0	0	0	0	0	0	0	0	0	10
WORCESTER	0	0	0	1 100	0	0	0	0	0	0	0	100
TOTAL	0	3 0	0	2	0	0	0	0	0	0	0	
		30		200							230	230

APPENDIX B.3-5 (CONT'D.)

Solvent Spills for 1990 Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	0	0	0	0	0	0	0	0	0	0	0
ESSEX	0	1 10	0	0	0	0	0	0	0	0	0	10
HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	0	0
MIDDLESEX	0	2 20	0	0	1 250	0	0	0	0	0	1	270
PLYMOUTH	0	1 10	0	0	0	0	0	0	0	0	0	10
SUFFOLK	0	1 10	1 50	0	0	0	0	0	0	0	0	60
WORCESTER	0	2 20	0	0	0	0	0	0	0	0	0	20
TOTAL	0	7 70	1 50	0	1 250	0	0	0	0	0	1	
		70	50		250						370	370

APPENDIX B.3-5 (CONT

APPENDIX

Styrene Spills for 1990 Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
HAMPSHIRE	0	1 10	0	2 200	0	0	0	0	0	0	0	210
Plu— HAMSTEAD	0	1 10	0	0	0	0	0	0	0	0	0	10
WORCESTER	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	0	2	0	2	0	0	0	0	0	0	0	
		20		200							220	

APPENDIX B.3-5 (CONT'D.)

Toluene Spills for 1990 Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
BERKSHIRE	0	(10)	0	0	1 250	0	0	0	0	0	0 (260)
BRISTOL	0	0	0	1 100	0	0	0	0	0	0	0 100
HAMSTEAD	0	1 (10)	0	0	0	1 500	0	0	0	0	0 510
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	0
WORCESTER	0	0	0	0	0	0	0	0	0	0	1
TOTAL	0	2	0	1	1	1	0	0	0	0	1
		20		100	250	500					870 ✓

APPENDIX B.3-5 (CONT'D.)

T chloroethane (111) Spills for 1990 Page 1 03/12/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BRISTOL	0	0	0	0	0	0	0	0	0	0	0	
ESSEX	0	0	0	0	0	0	0	0	0	0	0	
HAMPSHIRE	0	1 10	0	0	0	0	0	0	0	0	0	10
MIDDLESEX	1	0	0	0	0	0	0	0	0	0	0	1
SUFFOLK	0	1 10	0	0	0	0	0	0	0	0	0	10
WORCESTER	0	0	0	0	1 250	0	0	0	0	0	0	250
TOTAL	1	2	0	0	1	0	0	0	0	0	0	
	1	20			250						291	

APPENDIX B.3-5 (CONT'D.)

Trichloroethylene Spills for 1990 Page 1 03/10/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
BARNSTABLE	0	0	0	0	0	0	0	0	0	0	0
BRISTOL	0	0	0	0	0	0	0	0	0	0	0
NORFOLK	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0

APPENDIX B.3-5 (CONT'D.)

Xylene Spills for 1990 Page 1 03/10/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
BRISTOL	0	0	0	0	0	0	0	0	0	0	0
ESSEX	0	0	0	0	0	0	0	0	0	0	0
WORCESTER	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0

APPENDIX

APPENDIX B.3-5 (CONT'D.)

#2 Fuel Oil Spills for 1990 Page 1 03/10/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	40 4	0	400 4	1550 6	0	0	0	0	0	59	1,990
BERKSHIRE	0	10 1	0	100 1	500 2	0	0	0	0	0	9	610
BRISTOL	0	30 3	0	100 1	1000 4	1,000 2	3,000 3	0	10,000 1	0	22	15,130
DUKES	0	0	0	0	1000 1	0	0	0	0	0	3	1,000
ESSEX	2 2	150 15	0	500 5	250 1	3,000 6	0	10,000 2	0	0	21	13,902
FRANKLIN	0	10 1	0	200 2	500 2	500 1	1000 1	5,000 1	0	0	4	7,210
HAMPSHIRE	6 6	80 8	0	500 5	750 3	500 1	0	0	0	10,000 1	24	11,836
HAMSTEAD	0	20 2	0	100 1	250 1	1,000 2	0	0	0	0	16	1,370
MIDDLESEX	6 6	210 21	0	1400 14	3,250 13	2,000 4	2,000 2	10,000 2	0	0	65	18,866
NANTUCKET	0	0	0	0	250 1	0	0	5,000 1	0	0	1	5,250
NORFOLK	1 1	80 8	0	700 7	2,000 8	1500 3	0	5000 1	0	0	17	9,281
PLYMOUTH	0	80 8	0	500 5	750 3	500 1	0	0	0	0	18	1,830
SUFFOLK	1 1	170 17	0	700 7	1450 6	1500 3	1000 1	5000 [illegible]	0	0	23	9,821

APPENDIX

APPENDIX B.3-5 (CON.)

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#2 Fuel Oil Spills for 1990

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
WORCESTER	2 2	11 110	0	7 700	10 2500	4 2,000	2 1,000	1 5,000	1 10,000	0	34 22,312
TOTAL	18 18	99 9900	0	59 5900	61 15,250	27 52,000	9 9000	9 45,000	2 20,000	(1)	316

Check

APPENDIX B.3-5 (CONT'D.)

#4 Fuel Oil Spills for 1990 Page 1 03/10/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	10 1	0	0	0	0	0	0	0	0	1	10
BERKSHIRE	0	0	0	0	0	0	0	0	0	0	1	0
BRISTOL	0	0	0	0	0	0	0	0	0	0	1	0
ESSEX	0	30 3	0	100 1	0	0	0	0	0	0	6	130
FRANKLIN	0	10 1	0	0	0	0	0	0	0	0	0	10
HAMPSHIRE	1 1	30 3	0	0	0	0	0	0	0	0	5	31
MIDDLESEX	0	0	0	100 1	0	0	0	10,000 2	0	0	2	10,100
NORFOLK	0	10 1	0	0	250 1	0	0	0	0	0	4	260
PLYMOUTH	0	10 1	0	100 1	0	0	0	0	0	0	3	110
SUFFOLK	0	0	0	200 2	250 1	0	0	5,000 1	0	1 Ch	3	15,450 Ch
WORCESTER	0	0	0	200 2	250 1	0	0	0	0	0	4	450
TOTAL	1 1	100 10	0	700 7	750 3	0	0	15,000 3	0	1	30	

APPENDIX B.3-5 (CONT'D.)

#6 Fuel Oil Spills for 1990 Page 1 03/10/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BERKSHIRE	0	10 1	0	0	0	0	1000 1	0	0	0	1	1,010
BRISTOL	✓ 2	0	0	0	0	0	0	0	0	0	4	2
DUKES	0	0	0	0	0	0	0	0	0	0	0	0
ESSEX	0	0	0	0	0	0	0	5,000 1	0	0	5	5,000
FRANKLIN	0	0	0	0	0	0	0	0	0	0	1	0
HAMPSHIRE	1 1	20 2	0	0	0	0	0	0	0	0	7	21
HAMSTEAD	1 1	0	0	0	0	0	0	0	0	0	1	1
MIDDLESEX	0	10 1	0	100 1	0	0	0	5,000 1	0	0	8	5,110
NORFOLK	0	10 1	0	100 1	0	0	0	0	0	0	5	110
PLYMOUTH	0	0	0	0	0	0	0	0	0	0	2	0
SUFFOLK	0	10 1	0	0	0	0	1000 1	0	10,000 1	0	3	11,010
WORCESTER	0	0	0	100 1	250 1	0	0	0	0	0	1	350
TOTAL	4 4	60 6	0	300 3	250 1	0	2,000 2	10,000 2	10,000 1	0	38	22,614

APPENDIX B.3-5 (CONT'D.)

Asphalt Spills for 1990 Page 1 02/28/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
ESSEX	0	1 10	0	0	0	0	0	0	0	0	0 10
NORFOLK	0	0	0	0	0	0	0	0	0	0	0
SUFFOLK	0	0	0	0	0	0	0	0	0	0	0
WORCESTER	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1 10	0	0	0	0	0	0	0	0	0

APPENDIX

APPENDIX B.3-5 (CONT'D.)

Aviation Gas Spills for 1990

Page 1 02/28/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	0	0	0	1 250	0	0	0	0	0	0	250
MIDDLESEX	0	1 10	0	0	0	0	0	0	0	0	0	10
SUFFOLK	0	1 10	0	0	0	0	0	0	0	0	0	10
WORCESTER	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	0	2 20	0	0	1 250	0	0	0	0	0	0	T 271

APPENDIX B.3-5 (CONT'D.)

Diesel Fuel Spills for 1990 Page 1 02/28/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
	0	1	0	0	0	0	0	0	0	0	0	
BARNSTABLE	0	50 5	0	100 1	250 1	0	0	0	0	0	5	400
BERKSHIRE	0	30 3	0	400 4	250 1	500 1	0	0	0	0	1	1,180
BRISTOL	1 1	0	0	300 3	250 1	0	0	0	0	0	3	551
DUKES	0	0	0	0	250 1	0	0	0	0	0	0	250
ESSEX	0	80 8	0	500 5	500 2	0	0	5,000 1	0	0	3	6,080
FRANKLIN	0	30 3	0	100 1	250 1	0	1000 1	0	0	0	0	1,350
HAMPSHIRE	1 1	90 9	0	400 4	750 3	0	0	0	0	0	5	1,241
HAMSTEAD	0	0	0	0	0	0	0	0	0	0	0	000
MIDDLESEX	0	40 4	0	1100 11	750 3	0	2,000 2	0	0	0	10	3,890
NANTUCKET	0	10 1	0	0	0	0	0	0	10,000 1	0	0	10,010
NORFOLK	1 1	50 5	50 1	400 4	750 3	2,000 4	0	0	0	0	5	3,251
PLYMOUTH	0	10 2	0	0	0	0	0	[illegible]	0	0	7	10

APPENDIX

APPENDIX B.3-5 (C D.)

Page 2 02/28/92

Diesel Fuel Spills for 1990

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
SUFFOLK	0	10 1	0	700 7	250 1	0	1,000 1	5,000 1	0	0	6 6,980
WORCESTER	0	10 1	0	1,500 15	1,500 6	500 1	0	5,000 1	0	0	7 8,510
TOTAL	3 3	430 43	50 1	5500 55	5,750 23	3,000 6	4,000 4	15,000 3	10,000 1	0	52 24,483 43,713

APPENDIX B.3-5 (CONT'D.)

Gasoline Spills for 1990 Page 1 02/25/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
	0	0	0	1	0	0	0	0	0	0	0	
BARNSTABLE	0	30 3	0	100 1	0	0	0	0	0	0	18	130
BERKSHIRE	1 1	20 2	0	100 1	0	0	0	0	0	0	19	121
BRISTOL	0	60 6	0	100 1	0	500 1	0	0	0	0	21	660
DUKES	0	0	0	0	0	0	0	0	0	0	3	0
ESSEX	0	120 12	0	100 1	250 1	1000 2	0	0	0	0	43	1,370
FRANKLIN	0	20 2	0	0	0	0	0	0	0	0	7	20
HAMPSHIRE	0	120 12	0	100 1	0	0	0	0	10,000 1	0	29	10,220
HAMSTEAD	3 3	0	0	0	0	0	0	0	0	0	13	3
MIDDLESEX	1 1	150 15	0	300 3	250 1	0	0	0	0	0	102	701
NANTUCKET	0	0	0	0	0	0	0	0	0	0	0	0
NORFOLK	0	60 6	0	200 2	0	500 1	0	0	0	0	37	760
PLYMOUTH	1 1	60 6	0	0	0	0	0	[illegible]	0	0	28	61

APPENDIX

APPENDIX B.3-5 (C D.)

Page 2 02/25/92

Gasoline Spills for 1990

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
SUFFOLK	0	10 1	0	300 3	250 1	500 1	0	0	0	0	48	1,060
WORCESTER	0	90 9	0	200 2	750 3	0	1000 1	5000 1	0	0	56	7040
TOTAL	6 6	740 74	0	1600 16	1500 6	2,500 5	1,000 1	5,000 1	10,000 1	0	424	22,146

APPENDIX

APPENDIX B.3-5 (CONT'D.)

J[illegible] Fuel Spills for 1990

Page 1 02/25/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	1 10	0	0	0	0	0	0	0	0	0	10
ESSEX	0	1 10	0	0	1 250	0	0	0	0	0	3	260
HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	0	0
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	2	0
SUFFOLK	0	3 30	0	5 500	1 250	1 500	0	0	0	0	2	1,280
WORCESTER	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	0	5 50	0	5 500	2 500	1 500	0	0	0	0	7	1150

APPENDIX

Kerosene Spills for 1990 Page 1 02/25/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	0	0	0	0	0	0	0	0	0	1	0
BERKSHIRE	0	0	0	0	0	0	0	0	0	0	1	0
BRISTOL	0	10 ①	0	0	0	0	0	0	0	0	0	10
ESSEX	0	10 1	0	0	250 1	0	0	0	0	0	1	260
FRANKLIN	0	0	0	0	0	0	0	0	0	0	0	0
HAMPSHIRE	0	10 1	0	0	0	0	0	0	0	0	0	10
MIDDLESEX	0	10 1	0	0	250 1	0	0	0	0	0	0	260
PLYMOUTH	0	0	0	0	250 1	0	0	0	0	0	0	250
SUFFOLK	0	0	0	0	0	0	0	5,000 1	0	0	0	5,000
WORCESTER	1 1	0	0	0	0	0	0	0	0	0	0	1
TOTAL	1	40 4	0	0	750 3	0	0	5,000 1	0	0	3	5,790

APPENDIX B.3-5 (CONT'D.)

Miscellaneous Oil Spills for 1990 Page 1 02/25/92

NTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials	
BARNSTABLE	0	0	0	0	0	0	0	0	0	0	0	
BERKSHIRE	0	10 2	0	0	0	0	0	5,000 1	0	0	1	5,010
BRISTOL	0	0	0	100 1	0	0	0	0	0	0	0	100
ESSEX	0	40 4	0	0	250 1	0	0	0	0	0	6	290
FRANKLIN	0	0	0	0	0	0	0	0	0	0	0	0
HAMPSHIRE	0	20 2	0	100 1	0	0	0	0	0	0	0	120
HAMSTEAD	0	0	0	0	0	0	0	0	0	0	1	0
MIDDLESEX	2 2	0	0	100 1	250 1	0	0	0	0	0	10	352
NORFOLK	1 1	20 2	0	0	0	0	0	0	0	0	2	21
PLYMOUTH	0	0	0	0	0	0	0	0	0	0	0	0
SUFFOLK	0	40 4	0	0	250 1	0	0	5,000 1	10,000 1	0	2	15,290
WORCESTER	0	20 2	0	0	0	500 1	0	0	0	0	6	520
TOTAL	3 3	160 16	0	300 3	750 3	500 1	0	10,000 [illegible]	10,000 1	0	28	21,713

APPENDIX B.3-5 (CON .)

Formaldehyde Spills for 1990

Page 1 03/13/92

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
HAMPSHIRE	0	2	0	1	0	0	0	0	0	0	0
MIDDLESEX	0	0	1	0	1	0	0	0	0	0	0
TOTAL	0	2	1	1	1	0	0	0	0	0	0
		20	50	100	250						

U.S. Department
of Transportation
**United States
Coast Guard**

Commandant
U.S. Coast Guard

2100 Second Street S.W.
Washington, DC 20593-0001
Staff Symbol: (G-TGC-2)
Phone: (202) 267-2184

MAR 2 1992

5720

Commonwealth of Massachusetts
Department of Environmental Protection
Attn: Mr. Kenneth Santlal
Eighth Floor
One Winter Street
Boston, MA 02108

FREEDOM OF INFORMATION REQUEST (USCG CONTROL NUMBER 92-0121)

I have received your Freedom of Information Act request letter of January 23, 1992 in which you requested information in regards to hazardous chemical releases that occurred in CY 1990 in the State of Massachusetts.

I have enclosed a summary of the information from our data that is responsive to your request. Since the database only contains information "as reported" to the National Response Center, the enclosed information may not accurately reflect the actual number of releases (spills) that occurred, or the exact amount released (spilled).

You may appeal this determination within 30 days from the date of this letter. Address your appel to Commandant (G-TPS-2), 2100 Second Street SW, Washington, DC 20593. Your appel should include reasons for the reconsideration.

The cost of providing the requested information is minimal and waived.

Sincerely,

DW Beach

D. W. BEACH
Commander, U. S. Coast Guard
Chief, National Response Center
By direction of the Commandant

Encl: (1) Summary

HAZARDOUS CHEMICAL RELEASES FOR THE STATE OF MASSACHUSETTS

REPORT DATE:	REPORT #:	SPILL CNTY:	MATERIAL RELEASED:	QUANTITY RELEASED:
01/24/1990	01685	BARNSTABLE	UNKNOWN MATERIAL	0.00 UNK
02/06/1990	07122	BARNSTABLE	UNKNOWN T-SHIRT SILK SCREENING F	0.00 UNK
04/16/1990	17346	BARNSTABLE	GASOLINE CONTAMINATED SOIL	0.00 UNK
04/27/1990	19400	BARNSTABLE	PAINT	0.00 UNK
04/28/1990	19547	BARNSTABLE	GASOLINE: AUTOMOTIVE (4.23G PB/G	0.00 UNK
05/01/1990	19899	BARNSTABLE	AUTO BATTERS	0.00 UNK
07/14/1990	30928	BARNSTABLE	TRANSMISSION OIL	0.00 UNK
07/27/1990	32899	BARNSTABLE	POLYCHLORINATED BIPHENYLS	1.00 GAL
10/21/1990	44459	BARNSTABLE	CARBAMATE WDG FUNGACIDE EPA-4572	10.00 LBS
10/25/1990	45002	BARNSTABLE	HYDROCHLORIC ACID (20%)	2000.00 GAL
11/03/1990	46215	BARNSTABLE	UNKNOWN OIL	0.00 UNK
03/06/1990	11001	BERKSHIRE	UNKNOWN BLUE DYE	0.00 UNK
04/18/1990	17787	BERKSHIRE	POLYCHLORINATED BIPHENYLS, 500 P	0.00 UNK
06/07/1990	25677	BERKSHIRE	POLYCHLORINATED BIPHENYLS	20.00 LBS
07/23/1990	32203	BERKSHIRE	UNKNOWN MATERIAL	0.00 UNK
07/24/1990	32296	BERKSHIRE	PROPANE	0.00 UNK
12/03/1990	49684	BERKSHIRE	TOLUENE	1080.00 LBS
12/19/1990	51630	BERKSHIRE	SODIUM HYPOCHLORITE	1900.00 GAL
01/31/1990	06358	BRISTOL	METHYL METHACRYLATE	0.00 UNK
02/01/1990	06553	BRISTOL	SULFURIC ACID	779.00 GAL
03/02/1990	10470	BRISTOL	UNKNOWN FUMES	0.00 UNK
03/21/1990	13676	BRISTOL	1,1,1-TRICHLOROETHANE	20.00 GAL
03/28/1990	14823	BRISTOL	1,1,1-TRICHLOROETHANE	0.00 UNK
03/29/1990	14849	BRISTOL	SULFURIC ACID	5.00 GAL

APPENDIX

04/05/1990	15950	BRISTOL	GREEN SLIME	0.00	UNK
04/14/1990	17248	BRISTOL	55 GALLON DRUMS	0.00	UNK
05/02/1990	20173	BRISTOL	SODIUM HYPOCHLORITE	0.00	UNK
05/04/1990	20462	BRISTOL	UNKNOWN MATERIAL	0.00	UNK
05/14/1990	21751	BRISTOL	CURICELL	0.00	UNK
05/19/1990	22761	BRISTOL	POLYCHLORINATED BIPHENYLS	2.00	GAL
05/31/1990	24740	BRISTOL	UNKNOWN MATERIAL	0.00	UNK
06/10/1990	26157	BRISTOL	TOLUENE	100.00	GAL
06/18/1990	27322	BRISTOL	PUDDLES OF PAINT, TIRES	0.00	UNK
06/21/1990	27927	BRISTOL	UNKNOWN CHEMICAL	0.00	UNK
06/22/1990	28038	BRISTOL	POLYCHLORINATED BIPHENYLS	25.00	GAL
07/16/1990	31239	BRISTOL	STRONG CHEMICAL ODOR	0.00	UNK
07/16/1990	31247	BRISTOL	UNKNOWN MATERIAL	0.00	UNK
07/26/1990	32712	BRISTOL	WASTE OIL/LUBRICANTS - POSS. CO	0.00	UNK
08/04/1990	34026	BRISTOL	UNKNOWN MATERIAL	0.00	UNK
08/08/1990	34551	BRISTOL	VARIOUS OILS, ASBESTOS SHINGLES	0.00	UNK
09/25/1990	41000	BRISTOL	ASBESTOS	0.00	UNK
10/05/1990	42428	BRISTOL	UNKNOWN TOXIC ODOR IN THE AIR	0.00	UNK
10/06/1990	42547	BRISTOL	CHEMICAL VAPOR	0.00	UNK
10/23/1990	44771	BRISTOL	UNKNOWN MATERIAL	0.00	UNK
06/22/1990	27978	DUKES	PHOSPHORUS, BLACK	0.00	NON
01/06/1990	00459	ESSEX	UNKONWN GREEN LIQUID, POSS EGL	55.00	GAL
01/09/1990	00551	ESSEX	ANTIFREEZE	0.00	UNK
04/23/1990	18684	ESSEX	UNKNOWN MATERIAL	0.00	UNK
01/31/1990	06428	ESSEX	DRY CLEANING CHEMICALS	0.00	UNK
02/01/1990	06591	ESSEX	UNKNOWN MATERIAL	1.00	GAL
02/07/1990	07424	ESSEX	XYLENOL	0.00	UNK
03/06/1990	11102	ESSEX	VARIOUS THINNER AND		

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                                                        FINISHING CH
          0.00  UNK
04/05/1990  15916          ESSEX                        NO CHRIS CODE
          1.00  LBS
05/11/1990  21517          ESSEX                        MERCURY
          1.00  LBS
05/17/1990  22513          ESSEX                        COMBUSTIBLE CLEANING
                                                        LIQUID
         15.00  GAL
05/25/1990  23711          ESSEX                        UNKNOWN MATERIAL
          0.00  NON
06/01/1990  24762          ESSEX                        1,1,1-TRICHLOROETHAN
                                                        E
          0.00  UNK
06/04/1990  25155          ESSEX                        POLYCHLORINATED
                                                        BIPHENYLS
          0.00  UNK
06/14/1990  26862          ESSEX                        AMMONIUM HYDROXIDE,
                                                        28% AQ. (5-
         35.00  GAL
06/15/1990  27004          ESSEX                        NO CHRIS CODE
          0.00  UNK
07/07/1990  29878          ESSEX                        UNKNOWN MATERIAL
          0.00  UNK
07/11/1990  30447          ESSEX                        TETRACHLOROETHYLENE
         20.00  GAL
07/11/1990  30459          ESSEX                        CINDYE
         55.00  GAL
07/17/1990  31305          ESSEX                        UNKNOWN MATERIAL
          0.00  UNK
07/18/1990  31532          ESSEX                        UNKNOWN MATERIAL
                                                        (300 PPM)
          0.00  UNK
07/19/1990  31590          ESSEX                        UNKNOWN MATERIAL
          0.00  UNK
07/26/1990  32695          ESSEX                        SULFIDE
          0.00  UNK
07/26/1990  32731          ESSEX                        PAINT CHIPS
          0.00  UNK
07/27/1990  32931          ESSEX                        TETRACHLOROETHYLENE
          2.00  GAL
07/30/1990  33351          ESSEX                        TECHNETIUM 99-M
         90.00  OTH
08/02/1990  33758          ESSEX                        UNKNOWN MATERIAL
          0.00  UNK
08/16/1990  35742          ESSEX                        LEAD PAINT DUST AND
                                                        CHIPS
          0.00  UNK
08/29/1990  37457          ESSEX                        ETHYLENE GLYCOL
          0.00  UNK
11/12/1990  47357          ESSEX                        SODIUM HYDROXIDE (4
                                                        GALLONS/MINU
          0.00  UNK
04/30/1990  19774          FRANKLIN                     TOXIC PAINTS AND
                                                        THINNERS
          0.00  UNK
06/06/1990  25501          FRANKLIN                     UNKNOWN MATERIAL
         30.00  GAL
02/14/1990  08326          HAMPDEN                      PESTICIDES
          0.00  UNK
02/14/1990  08365          HAMPDEN                      PESTICIDES
          0.00  UNK
02/20/1990  09090          HAMPDEN                      UNKNOWN MATERIAL
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          0.00  UNK
02/22/1990  09320           HAMPDEN                   PAINT RELATED
                                                      MATERIAL

          0.00  UNK
03/09/1990  11521           HAMPDEN                   SULFURIC ACID (97
                                                      PERCENT)

       6000.00  LBS
04/16/1990  17438           HAMPDEN                   UNKNOWN MATERIAL
          0.00  UNK
05/14/1990  21817           HAMPDEN                   RICH GOLD BRONZE
                                                      POWDER

          0.00  UNK
07/23/1990  32199           HAMPDEN                   COOLING WATER
                                                      PERFORMAX 4400 ( B

         30.00  GAL
07/25/1990  32499           HAMPDEN                   COAL TAR
          0.00  UNK
10/30/1990  45565           HAMPDEN                   HYDRAZINE
          2.00  GAL
11/24/1990  48730           HAMPDEN                   PROPANE
          0.00  UNK
08/22/1990  36449           HAMPSHIRE                 ARSENIC PENTAOXIDE
          3.00  LBS
01/16/1990  01097           MIDDLESEX                 SILICATES, ACIDS
          0.00  UNK
01/22/1990  01510           MIDDLESEX                 DIETHYL
                                                      HEXYLPHTHALATE

         75.00  GAL
01/29/1990  06124           MIDDLESEX                 TETRACHLOROETHYLENE
         30.00  GAL
04/24/1990  18820           MIDDLESEX                 PETROLIUM
                                                      HYDROCARBONS 456
                                                      MG/L

          0.00  UNK
02/08/1990  07503           MIDDLESEX                 BLACK SOOT
          0.00  UNK
03/08/1990  11512           MIDDLESEX                 UNKNOWN RADIOACTIVE
                                                      MATERIAL

          0.00  UNK
03/28/1990  14727           MIDDLESEX                 POTASSIUM CYANIDE
        200.00  GAL
04/11/1990  16814           MIDDLESEX                 EITHER UNKNOWN OIL
                                                      OR GASOLINE

          0.00  UNK
04/20/1990  18131           MIDDLESEX                 GREEN LIQUID
          0.00  UNK
05/31/1990  24594           MIDDLESEX                 MIXED SOLVENTS
        190.00  GAL
06/05/1990  25449           MIDDLESEX                 IRON
          0.00  UNK
06/06/1990  25475           MIDDLESEX                 HYDROCHLORIC ACID
          1.00  GAL
06/18/1990  27355           MIDDLESEX                 UNKNOWN MATERIAL
          0.00  UNK
07/06/1990  29758           MIDDLESEX                 PERCHLOROETHYLENE
          4.00  GAL
07/10/1990  30175           MIDDLESEX                 HYDROCHLORIC ACID
       2000.00  LBS
07/13/1990  30744           MIDDLESEX                 AMMONIA, ANHYDROUS
         20.00  LBS
08/06/1990  34170           MIDDLESEX                 ETHYLENE GLYCOL
          0.00  UNK
08/13/1990  35244           MIDDLESEX                 UNKNOWN MATERIAL
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          0.00  UNK
08/24/1990  36852           MIDDLESEX              PAINTS
          0.00  UNK
09/19/1990  39986           MIDDLESEX              POLYCHLORINATED
                                                   BIPHENYLS

         15.00  LBS
10/15/1990  43705           MIDDLESEX              ODORANT
          4.00  OTH
11/06/1990  46558           MIDDLESEX              WITCOLATE 1276
          1.00  GAL
12/26/1990  52452           NANTUCKET              POLYCHLORINATED
                                                   BIPHENYLS

         15.00  GAL
01/10/1990  00653           NORFOLK                UNKNOWN MATERIAL
          0.00  UNK
01/26/1990  01921           NORFOLK                PERCHLOROETHYLENE
          0.00  OTH
02/21/1990  09193           NORFOLK                ETHYLENE
          0.00  UNK
03/16/1990  12872           NORFOLK                TRIVALENT CHROME
          4.00  LBS
07/27/1990  32872           NORFOLK                SULFURIC ACID
        600.00  GAL
07/30/1990  33365           NORFOLK                UNKNOWN MATERIAL
          0.00  UNK
09/07/1990  38570           NORFOLK                SODIUM HYDROXIDE
       6000.00  LBS
09/11/1990  39000           NORFOLK                TRICHLOROFLUOROMETHA
                                                   NE (FREON)

        620.00  GAL
09/24/1990  40712           NORFOLK                OAKITE 56
          0.00  UNK
09/25/1990  40977           NORFOLK                TRICHLOROETHYLENE
          0.00  UNK
09/27/1990  41330           NORFOLK                SODIUM SILICATE
         20.00  GAL
10/08/1990  42700           NORFOLK                OIL: DIESEL
          0.00  UNK
10/27/1990  45260           NORFOLK                VERY WHITE FOAMY
                                                   SLICK

          0.00  UNK
11/29/1990  49274           NORFOLK                WASTE CHLORONATED
                                                   SOLVENTS

         50.00  GAL
12/11/1990  50669           NORFOLK                UNKNOWN MATERIAL,
                                                   GREEN COLORED

          0.00  UNK
12/18/1990  51465           NORFOLK                MISC PAINTS AND
                                                   THINNERS

          0.00  UNK
01/04/1990  00310           PLYMOUTH               TRICHLOROETHANE
                                                   (120000 PPB)

          0.00  NON
04/24/1990  18760           PLYMOUTH               DRI CLEANING
                                                   CHEMICALS

          0.00  UNK
04/24/1990  18779           PLYMOUTH               UNKNOWN MATERIAL
          0.00  UNK
04/09/1990  16469           PLYMOUTH               POLYCHLORINATED
                                                   BIPHENYLS FLUID

         12.00  GAL
05/08/1990  20995           PLYMOUTH               UNKNOWN MATERIAL
          0.00  UNK
```

06/07/1990	25724	PLYMOUTH	GARBAGE, DRUMS	0.00	UNK
07/19/1990	31677	PLYMOUTH	PRINTING INK	0.00	UNK
08/02/1990	33717	PLYMOUTH	UNKNOWN MATERIAL	0.00	UNK
09/07/1990	38493	PLYMOUTH	PERCHLOROETHYLENE	1.00	GAL
09/13/1990	39162	PLYMOUTH	SODIUM HYDROXIDE	0.00	UNK
10/04/1990	42369	PLYMOUTH	UNKNOWN MATERIAL	0.00	UNK
02/09/1990	07652	SUFFOLK	PAINT STRIPPER	0.00	UNK
02/11/1990	07912	SUFFOLK	UNKNOWN GREEN MATERIAL, LIKE ANT	0.00	UNK
02/17/1990	08790	SUFFOLK	ACRID, BURNING RUBBER SMELLING S	0.00	UNK
05/24/1990	23683	SUFFOLK	BLACK SMOKE	0.00	UNK
06/20/1990	27706	SUFFOLK	HYDROCHLORIC ACID	35.00	GAL
08/27/1990	37136	SUFFOLK	UNKNOWN MATERIAL	0.00	UNK
09/06/1990	38362	SUFFOLK	ETHYLENE GLYCOL	0.00	UNK
09/06/1990	38371	SUFFOLK	THICK PLASTIC BAGS	0.00	UNK
11/12/1990	47347	SUFFOLK	STYROFOAM AND TRASH IN PLASTIC B	0.00	UNK
11/27/1990	49040	SUFFOLK	UNKNOWN MATERIAL POSSIBLE EXCAVA	0.00	UNK
12/12/1990	50740	SUFFOLK	UNKNOWN MATERIAL	0.00	UNK
12/21/1990	51911	SUFFOLK	BOX OF HOSPITAL WASTE	1.00	OTH
12/21/1990	51917	SUFFOLK	SODIUM HYPOCHLORITE (15% or less	0.00	UNK
08/18/1990	35970	UNKNOWN	DIESEL FUMES	0.00	UNK
02/14/1990	08348	WORCESTER	ASBESTOS	0.00	UNK
03/05/1990	10934	WORCESTER	N-PROPYL ALCOHOL	0.00	UNK
03/08/1990	11511	WORCESTER	ETHYLENE GLYCOL	0.00	UNK
03/12/1990	11940	WORCESTER	1,1,1-TRICHLOROETHANE	180.00	GAL
03/12/1990	11966	WORCESTER	RED, ORANGE COLOR MATERIAL	0.00	UNK
04/19/1990	17945	WORCESTER	ISOPHORONE DIISOCYANAPE	10.00	GAL
05/04/1990	20536	WORCESTER	UNKNOWN MATERIAL	0.00	UNK

05/09/1990	21119	WORCESTER	GREEN SLIME	0.00	UNK
05/23/1990	23485	WORCESTER	UNKNOWN OIL	0.00	UNK
06/08/1990	25869	WORCESTER	ASPHALT, CONCRETE	0.00	UNK
06/15/1990	27019	WORCESTER	UNKNOWN MATERIAL	0.00	NON
07/03/1990	29332	WORCESTER	POLYCHLORINATED BIPHENYLS (238	5.00	GAL
07/09/1990	30120	WORCESTER	WASTE OIL, GASOLINE, ANTI-FREEZE	0.00	UNK
07/30/1990	33236	WORCESTER	TRICHLOROTRIFLOROETHANE	3.00	GAL
08/10/1990	34946	WORCESTER	TOXIC WASTE	0.00	UNK
09/05/1990	38282	WORCESTER	VARIOUS PAINTS, THINNERS, ETC.	0.00	UNK
09/15/1990	39422	WORCESTER	UNKNOWN MATERIAL	0.00	UNK
09/18/1990	39722	WORCESTER	UNKNOWN MATERIAL	0.00	UNK
09/24/1990	40661	WORCESTER	MAGNESIUM THORIUM	0.00	UNK
10/27/1990	45247	WORCESTER	DARK GREEN MATERIAL	0.00	UNK
10/30/1990	45672	WORCESTER	HIGH PH WASTE WATER	0.00	UNK
12/08/1990	50392	WORCESTER	GREEN DYE	0.00	UNK

APPE X B.3-6

Total Chemical ases by County for May through September 1990 From Underground Sto Tanks Page 1 09/24/93

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
BARNSTABLE	0	2	0	0	1	0	0	0	0	0	35
BERKSHIRE	0	0	0	0	1	0	0	0	0	0	3
BRISTOL	0	0	0	0	0	0	0	0	0	0	7
ESSEX	0	2	0	1	0	0	0	0	0	0	11
HAMPDEN	0	1	0	0	0	0	0	0	0	1	9
HAMPSHIRE	0	0	0	1	0	0	0	0	0	0	6
MIDDLESEX	0	0	1	0	0	1	1	0	0	0	30
NORFOLK	0	1	0	1	0	0	0	0	0	0	6
PLYMOUTH	0	0	0	0	0	1	0	0	0	0	7
SUFFOLK	0	0	0	0	0	0	0	0	0	0	9
WORCESTER	0	0	0	0	1	0	0	0	1	0	13
#2 FUEL OIL	0	6	1	3	3	2	1	0	1	1	136
BARNSTABLE	0	1	0	0	0	0	0	0	0	0	1

APPENDIX B.3-6 cont'd

Total Chemical Releases by County for May through September 1990 From Underground Storage Tanks   Page 2   09/24/93

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
BERKSHIRE	0	0	0	0	0	0	0	0	0	0	1
ESSEX	0	0	0	1	0	0	0	0	0	0	3
HAMPDEN	0	1	0	0	0	0	0	0	0	0	1
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	1
NORFOLK	0	0	0	0	0	0	0	0	0	0	2
PLYMOUTH	0	0	0	1	0	0	0	0	0	0	1
WORCESTER	0	0	0	0	0	0	0	0	0	0	2
#4 FUEL OIL	0	2	0	2	0	0	0	0	0	0	12
BRISTOL	0	0	0	0	0	0	0	0	0	0	1
ESSEX	0	0	0	0	0	0	0	0	0	0	2
HAMPDEN	0	0	0	0	0	0	0	0	0	0	3
HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	1
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	4

APPENDIX B.3-6 cont'd

Total Chemical Releases by County for May through September 1990 From Underground Storage Tanks   Page 3   09/24/93

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
NORFOLK	0	0	0	0	0	0	0	0	0	0	4
PLYMOUTH	0	0	0	0	0	0	0	0	0	0	1
SUFFOLK	0	0	0	0	0	0	1	0	0	0	1
#6 FUEL OIL	0	0	0	0	0	0	1	0	0	0	17
ESSEX	0	0	0	0	0	0	1	0	0	0	1
~~**CHLORINE**~~	0	0	0	0	0	0	1	0	0	0	~~1~~
BARNSTABLE	0	0	0	0	0	0	0	0	0	0	1
ESSEX	0	0	0	0	0	0	0	0	0	0	3
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	6
NORFOLK	0	0	0	0	0	0	0	0	0	0	1
PLYMOUTH	0	0	0	0	0	0	0	0	0	0	3
SUFFOLK	0	0	0	0	0	0	0	0	0	0	4
WORCESTER	0	0	0	0	0	0	0	0	0	0	3

APPENDIX B.3-6 cont'd

Total Chemical Releases by County for May through September 1990 From Underground Storage Tanks Page 4 09/24/93

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
DIESEL FUEL	0	0	0	0	0	0	0	0	0	0	21
BARNSTABLE	0	1	0	0	0	0	0	0	0	0	8
BERKSHIRE	0	0	0	0	0	0	0	0	0	0	6
BRISTOL	0	0	0	0	0	0	0	0	0	0	12
DUKES	0	0	0	0	0	0	0	0	0	0	2
ESSEX	0	1	0	0	0	0	0	0	0	0	25
FRANKLIN	0	0	0	0	0	0	0	0	0	0	4
HAMPDEN	0	1	0	0	0	0	0	0	1	0	19
HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	3
MIDDLESEX	0	0	0	2	0	0	0	0	0	0	50
NORFOLK	0	0	0	2	0	0	0	0	0	0	17
PLYMOUTH	0	0	0	0	0	0	0	0	0	0	17
SUFFOLK	0	0	0	0	0	0	0	0	0	0	24

Appendix B.3-6

Total Chemical Releases by County for May through September 1990 From Underground Storage Tanks Page 5 09/24/93

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
WORCESTER	0	0	0	0	0	0	1	1	0	0	24
GASOLINE	0	3	0	4	0	0	1	1	1	0	211
ESSEX	0	0	0	0	0	0	0	0	0	0	3
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	1
SUFFOLK	0	1	0	0	0	0	0	0	0	0	2
JET FUEL	0	1	0	0	0	0	0	0	0	0	6
ESSEX	0	0	0	0	0	0	0	0	0	0	1
KEROSENE	0	0	0	0	0	0	0	0	0	0	1
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	1
LUBRICATING OIL	0	0	0	0	0	0	0	0	0	0	1
ESSEX	0	0	0	0	0	0	0	0	0	0	3
HAMPDEN	0	0	0	0	0	0	0	0	0	0	1
MIDDLESEX	0	0	0	1	0	0	0	0	0	0	3

APPENDIX B.3-6

Total Chemical Releases by County for May through September 1990 From Underground Storage Tanks   Page 6   09/24/93

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
NORFOLK	1	0	0	0	0	0	0	0	0	0	2
WORCESTER	0	0	0	0	0	0	0	0	0	0	1
MISCELLANEOUS OIL	1	0	0	1	0	0	0	0	0	0	10
BARNSTABLE	0	0	0	0	0	0	0	0	0	0	3
BERKSHIRE	0	0	0	0	0	0	0	0	0	0	1
BRISTOL	0	0	0	0	0	0	0	0	0	0	4
ESSEX	0	0	0	0	0	0	0	0	0	0	9
HAMPDEN	0	0	0	0	0	0	0	0	0	0	1
MIDDLESEX	0	0	0	0	0	0	0	0	0	0	10
NORFOLK	0	0	0	0	0	0	0	0	1	0	9
PLYMOUTH	0	0	0	1	0	0	0	0	0	0	6
SUFFOLK	0	0	0	0	0	0	0	0	0	0	5
WORCESTER	0	0	0	1	0	1	0	0	0	0	9

APPENDIX B.3-6

Total Chemical Releases by County for May through September 1990 From Underground Storage Tanks

COUNTY		Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
OTHER MATERIAL	-->	0	0	0	2	0	1	0	0	1	0	57
WORCESTER		0	0	0	0	0	0	0	0	0	0	1
TOLUENE		0	0	0	0	0	0	0	0	0	0	1
NORFOLK		0	0	0	0	0	0	0	0	0	0	1
UNKNOWN		0	0	0	0	0	0	0	0	0	0	1
BARNSTABLE		0	0	0	0	0	0	0	0	0	0	1
BRISTOL		0	0	0	0	0	0	0	0	0	0	1
ESSEX		0	0	0	0	0	0	0	0	0	0	4
HAMPDEN		0	0	0	0	0	0	0	0	0	0	2
HAMPHIRE		0	0	0	0	0	0	0	0	0	0	1
MIDDLESEX		0	0	0	0	0	0	0	0	0	0	7
PLYMOUTH		0	0	0	0	0	0	0	0	0	0	1
SUFFOLK		0	0	0	0	0	1	0	0	0	0	3

APPENDIX B.3-6 cont'd

Total Chemical Releases by County for May through September 1990 From Underground Storage Tanks Page 8 09/24/93

COUNTY	Less than 1 gallon	1-10 gallons	11-50 gallons	51-100 gallons	101-250 gallons	251-500 gallons	501-1000 gallons	1001-5001 gallons	5001-10,000 gallons	10,001 & UP gallons	No. of USTs as a Spill Source for Listed Materials
WORCESTER	0	0	0	0	0	0	0	0	0	0	2
WASTE OIL	0	0	0	0	0	1	0	0	0	0	22
TOTAL	1	12	1	12	3	4	4	1	3	1	497

APPENDIX TABLE B.4

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                    TABLE B.4-1   RESIDENTIAL BITUMINOUS COAL EMISSIONS 1990
amsbcoal
   SCC :       21-04-002-000
               STATIONARY SOURCE FUEL COMBUSTION
               RESIDENTIAL :   BITUMINOUS COAL

   STATE ACTIVITY LEVEL :      12,000     TONS

   COUNTY ACTIVITY LEVEL :         ANNUAL   OZ PO    CO PC      VOC TPY VOC PO     NOX TPY  NOX PO      CO TPY  CO PO  CO PC
    ---------------------          COUNTY  COUNTY    ACTIV       EM.EF   TPSD      EM.FAC    TPSD       EM.FAC   TPSD   TPWD
   COUNTIES   POP 1990    %      ACTIVITY   ACTIV  151/182     10LB/TON   * 0     3 LB/TN    * 0     90 LB/TN    * 0  /151
   ========  =========  ====      =======  ======  =======     ========  =====    ========  ======    ======== ====   =====
  1 BARNSTABLE  186605   3.1%     372.19     0.0    308.8         1.86   0.00        0.56    0.00       16.75   0.00   0.09
  2 BERKSHIRE   139352   2.3%     277.94     0.0    230.6         1.39   0.00        0.42    0.00       12.51   0.00   0.07
  3 BRISTOL     506325   8.4%    1009.89     0.0    837.9         5.05   0.00        1.51    0.00       45.44   0.00   0.25
  4 DUKES        11639   0.2%      23.21     0.0     19.3         0.12   0.00        0.03    0.00        1.04   0.00   0.01
  5 ESSEX       670080  11.1%    1336.50     0.0   1108.9         6.68   0.00        2.00    0.00       60.14   0.00   0.33
  6 FRANKLIN     70092   1.2%     139.80     0.0    116.0         0.70   0.00        0.21    0.00        6.29   0.00   0.03
  7 HAMPDEN     456310   7.6%     910.13     0.0    755.1         4.55   0.00        1.37    0.00       40.96   0.00   0.23
  8 HAMPSHIRE   146568   2.4%     292.34     0.0    242.5         1.46   0.00        0.44    0.00       13.16   0.00   0.07
  9 MIDDLESEX  1398468  23.2%    2789.30     0.0   2314.2        13.95   0.00        4.18    0.00      125.52   0.00   0.69
 10 NANTUCKET     6012   0.1%      11.99     0.0      9.9         0.06   0.00        0.02    0.00        0.54   0.00   0.00
 11 NORFOLK     616087  10.2%    1228.81     0.0   1019.5         6.14   0.00        1.84    0.00       55.30   0.00   0.30
 12 PLYMOUTH    435276   7.2%     868.18     0.0    720.3         4.34   0.00        1.30    0.00       39.07   0.00   0.21
 13 SUFFOLK     663906  11.0%    1324.19     0.0   1098.6         6.62   0.00        1.99    0.00       59.59   0.00   0.33
 14 WORCESTER   709705  11.8%    1415.53     0.0   1174.4         7.08   0.00        2.12    0.00       63.70   0.00   0.35

   STATE       6016425 100.0%   12000.00     0.0   9956.0        60.00   0.00       18.00    0.00      540.00   0.00   2.97

ACTIVITY LEVEL UNITS :         TONS                                                                          ANNUAL ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :       BURNED                          NON-ATT   COUNT        TOWN  COUNTY      %TOWN   TOWN   TOWN    TOWN   TPWD
ACTIVITY LEVEL METHOD :                                          TOWNS                POPUL   POPUL      /CNTY  ACTIV CO TPY   ACTIV  /151
                                                               =======   =====    ======== =======     ====== ====== ====== ======= ======
PEAK OZ DAYS/WEEK :             0                               BOSTON   SUFFO      574283  663906      86.5%1145.4  51.54   950.3   0.28
PEAK OZ WEEKS/YEAR :            0            PO THROUGHPUT : 0% CAMBRIDGE MIDSE      95802 1398468       6.9% 191.1   8.60   158.5   0.05
                                                                QUINCY   NORFO       84985  616087      13.8% 169.5   7.63   140.6   0.04
PEAK CO DAYS/WEEK :             7                              MEDFORD   MIDSE       57407 1398468       4.1% 114.5   5.15    95.0   0.03
                                                          50
PEAK CO WEEKS/YEAR :            26           PC THROUGHPUT: 85%  REVERE   SUFFO       42786  663906       6.4%  85.3   3.84    70.8   0.02
                                                                MALDEN   MIDSE       53884 1398468       3.9% 107.5   4.84    89.2   0.03
EMISSION FACTORS :        VOC:  10.0                           CHELSEA   SUFFO       28710  663906       4.3%  57.3   2.58    47.5   0.01
                          NOX:  3.0                            EVERETT   MIDSE       35701 1398468       2.6%  71.2   3.20    59.1   0.02
                          CO:   90.0                        SOMERVILLE   MIDSE       76210 1398468       5.4% 152.0   6.84   126.1   0.04
EMISSION FACTOR UNITS :         LB/TON       AP-42 TABLE 1.1-1                                     TOTAL MET.BOSTON    94.22 1737.17   0.52
                                                             WORCESTER   WORCE      169759  709705      23.9% 338.6  15.24   280.9   0.08
RULE EFFECTIVENESS :            N/A                        SPRINGFIELD   HAMPD·     156983  456310      34.4% 313.1  14.09   259.8   0.08
RULE PENETRATION :              N/A                             LOWELL   MIDSE      103439 1398468       7.4% 206.3   9.28   171.2   0.05
SIP RULE :                      NO                             WALTHAM   MIDSE       57878 1398468       4.1% 115.4   5.19    95.8   0.03

PO INTERVAL :                   1 HR
PC INTERVAL :                   8 HR

WEEKDAY:         70 %      SAT : 15 %       SUN :      15 %
                                                                                 DEC
COMMENTS:     NO SUMMER ACTIVITY, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~-FEB (TABLE C.4 MOBILE SECTION)
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                  TABLE B.4-2   RESIDENTIAL ANTHRACITE COAL EMISSIONS 1990
resacoal
   SCC :      21-04-001-000
             STATIONARY SOURCE FUEL COMBUSTION
             RESIDENTIAL :   ANTHRACITE COAL

   STATE ACTIVITY LEVEL :          17000 TONS

   COUNTY ACTIVITY LEVEL :          ANNUAL    OZ PO    CO PC    VOC TPY VOC PO    NOX TPY  NOX PO     CO TPY   CO PO  CO PC
   ---------------------            COUNTY   COUNTY    ACTIV      EM.EF   TPSD     EM.FAC    TPSD     EM.FAC    TPSD   TPWD
   COUNTIES   POP 1990    %       ACTIVITY    ACTIV  151/182   10LB/TON    * 0    3 LB/TN     * 0   90 LB/TN     * 0
   ========  ========   ====      =======    ======  =======   ========  =====   ========  ======   ========   =====  =====
 1 BARNSTABLE   186605   3.1%       527.27      0.0    437.5       2.64   0.00       0.79    0.00      23.73    0.00   0.13
 2 BERKSHIRE    139352   2.3%       393.75      0.0    326.7       1.97   0.00       0.59    0.00      17.72    0.00   0.10
 3 BRISTOL      506325   8.4%      1430.67      0.0   1187.0       7.15   0.00       2.15    0.00      64.38    0.00   0.35
 4 DUKES         11639   0.2%        32.89      0.0     27.3       0.16   0.00       0.05    0.00       1.48    0.00   0.01
 5 ESSEX        670080  11.1%      1893.38      0.0   1570.9       9.47   0.00       2.84    0.00      85.20    0.00   0.47
 6 FRANKLIN      70092   1.2%       198.05      0.0    164.3       0.99   0.00       0.30    0.00       8.91    0.00   0.05
 7 HAMPDEN      456310   7.6%      1289.35      0.0   1069.7       6.45   0.00       1.93    0.00      58.02    0.00   0.32
 8 HAMPSHIRE    146568   2.4%       414.14      0.0    343.6       2.07   0.00       0.62    0.00      18.64    0.00   0.10
 9 MIDDLESEX   1398468  23.2%      3951.51      0.0   3278.4      19.76   0.00       5.93    0.00     177.82    0.00   0.98
10 NANTUCKET      6012   0.1%        16.99      0.0     14.1       0.08   0.00       0.03    0.00       0.76    0.00   0.00
11 NORFOLK      616087  10.2%      1740.81      0.0   1444.3       8.70   0.00       2.61    0.00      78.34    0.00   0.43
12 PLYMOUTH     435276   7.2%      1229.92      0.0   1020.4       6.15   0.00       1.84    0.00      55.35    0.00   0.30
13 SUFFOLK      663906  11.0%      1875.93      0.0   1556.4       9.38   0.00       2.81    0.00      84.42    0.00   0.46
14 WORCESTER    709705  11.8%      2005.34      0.0   1663.8      10.03   0.00       3.01    0.00      90.24    0.00   0.50

   STATE       6016425 100.0%     17000.00      0.0  14104.4      85.00   0.00      25.50    0.00     765.00    0.00   4.20

ACTIVITY LEVEL UNITS :        TONS                                                                       ANNUAL ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                      NON-ATT   COUNT      TOWN  COUNTY      %TOWN   TOWN   TOWN    TOWN   TPWD
ACTIVITY LEVEL METHOD :                                     TOWNS              POPUL   POPUL      /CNTY  ACTIV CO TPY   ACTIV   /151
                                                          =======   =====  ======== =======     ====== ====== ====== ======= ======
PEAK OZ DAYS/WEEK :            0                           BOSTON   SUFFO    574283  663906      86.5% 1622.7  73.02  1346.3   0.40
PEAK OZ WEEKS/YEAR :           0       PO THROUGHPUT : 0%  CAMBRIDGE MIDSE    95802 1398468       6.9%  270.7  12.18   224.6   0.07
                                                           QUINCY   NORFO     84985  616087      13.8%  240.1  10.81   199.2   0.06
PEAK CO DAYS/WEEK :            7                          MEDFORD   MIDSE     57407 1398468       4.1%  162.2   7.30   134.6   0.04
PEAK CO WEEKS/YEAR :           26      PC THROUGHPUT: ~~83%~~ 50  REVERE    SUFFO     42786  663906       6.4%  120.9   5.44   100.3   0.03
                                                           MALDEN   MIDSE     53884 1398468       3.9%  152.3   6.85   126.3   0.04
EMISSION FACTORS :      VOC:   10.0                       CHELSEA   SUFFO     28710  663906       4.3%   81.1   3.65    67.3   0.02
                        NOX:   3.0                        EVERETT   MIDSE     35701 1398468       2.6%  100.9   4.54    83.7   0.02
                        CO:    90.0                    SOMERVILLE   MIDSE     76210 1398468       5.4%  215.3   9.69   178.7   0.05
EMISSION FACTOR UNITS :       LB/TON   AP-42 TABLE 1.2-1                                   TOTAL MET.BOSTON    133.48 2460.99   0.73
                                                        WORCESTER   WORCE    169759  709705      23.9%  479.7  21.59   398.0   0.12
RULE EFFECTIVENESS :           N/A                    SPRINGFIELD   HAMPD    156983  456310      34.4%  443.6  19.96   368.0   0.11
RULE PENETRATION :             N/A                         LOWELL   MIDSE    103439 1398468       7.4%  292.3  13.15   242.5   0.07
SIP RULE :                     NO                         WALTHAM   MIDSE     57878 1398468       4.1%  163.5   7.36   135.7   0.04

PO INTERVAL :                  1 HR
PC INTERVAL :                  8 HR

WEEKDAY:        70 %      SAT : 15 %       SUN :      15 %

COMMENTS:     NO SUMMER ACTIVITY, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)
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TABLE B.4-3 RESIDENTIAL DISTILLATE OIL EMISSIONS 1990

resdoil
SCC : 21-04-004-000
STATIONARY SOURCE FUEL COMBUSTION
RESIDENTIAL : DISTILLATE OIL

STATE ACTIVITY LEVEL : 726,054 TH.GALLS (17,287 T.BARRELS * 42 GALLS)

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY GALLONS	OZ PO COUNTY ACTIV	CO PC ACTIV 83% 151/182	VOC TPY EM.EF .713LB/T.GL	VOC PO TPSD * 0	NOX TPY EM.FAC 18 LB/TH	NOX PO TPSD * 0	CO TPY EM.FAC 5 LB/TH	CO PO TPSD * 0	CO PC TPWD /151
1	BARNSTABLE	186605	3.1%	22519	0.0	18684	8.03	0.00	202.67	0.00	56.30	0.00	0.31
2	BERKSHIRE	139352	2.3%	16817	0.0	13952	6.00	0.00	151.35	0.00	42.04	0.00	0.23
3	BRISTOL	506325	8.4%	61103	0.0	50695	21.78	0.00	549.92	0.00	152.76	0.00	0.84
4	DUKES	11639	0.2%	1405	0.0	1165	0.50	0.00	12.64	0.00	3.51	0.00	0.02
5	ESSEX	670080	11.1%	80864	0.0	67091	28.83	0.00	727.78	0.00	202.16	0.00	1.11
6	FRANKLIN	70092	1.2%	8459	0.0	7018	3.02	0.00	76.13	0.00	21.15	0.00	0.12
7	HAMPDEN	456310	7.6%	55067	0.0	45687	19.63	0.00	495.60	0.00	137.67	0.00	0.76
8	HAMPSHIRE	146568	2.4%	17688	0.0	14675	6.31	0.00	159.19	0.00	44.22	0.00	0.24
9	MIDDLESEX	1398468	23.2%	168765	0.0	140019	60.16	0.00	1518.89	0.00	421.91	0.00	2.32
10	NANTUCKET	6012	0.1%	726	0.0	602	0.26	0.00	6.53	0.00	1.81	0.00	0.01
11	NORFOLK	616087	10.2%	74349	0.0	61685	26.51	0.00	669.14	0.00	185.87	0.00	1.02
12	PLYMOUTH	435276	7.2%	52529	0.0	43581	18.73	0.00	472.76	0.00	131.32	0.00	0.72
13	SUFFOLK	663906	11.0%	80119	0.0	66473	28.56	0.00	721.07	0.00	200.30	0.00	1.10
14	WORCESTER	709705	11.8%	85646	0.0	71058	30.53	0.00	770.82	0.00	214.12	0.00	1.18
				0			0.00		0.00		0.00		0.00
	STATE	6016425	100.0%	726054	0.0	602385	258.84	0.00	6534.49	0.00	1815.14	0.00	9.97

ACTIVITY LEVEL UNITS : TH.GALLONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 0
PEAK OZ WEEKS/YEAR : 0 PO THROUGHPUT : 0%

PEAK CO DAYS/WEEK : 7
PEAK CO WEEKS/YEAR : 2~~0~~6 PC THROUGHPUT: 50 83%

EMISSION FACTORS : VOC: 0.713
NOX: 18.0
CO: 5.0
EMISSION FACTOR UNITS : LB/TH.GAL AP-42 TABLE 1.3-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: 70 % SAT : 15 % SUN : 15 %

NON-ATT TOWNS	COUNT	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV T.GALS	ANNUAL CO TPY EF 5LB	PEAK CO ACTIV T.GALS	PEAK CO TPWD /151
BOSTON	SUFFO	574283	663906	86.5%	69304	173.26	57499	0.95
CAMBRIDGE	MIDSE	95802	1398468	6.9%	11561	28.90	9592	0.16
QUINCY	NORFO	84985	616087	13.8%	10256	25.64	8509	0.14
MEDFORD	MIDSE	57407	1398468	4.1%	6928	17.32	5748	0.10
REVERE	SUFFO	42786	663906	6.4%	5163	12.91	4284	0.07
MALDEN	MIDSE	53884	1398468	3.9%	6503	16.26	5395	0.09
CHELSEA	SUFFO	28710	663906	4.3%	3465	8.66	2875	0.05
EVERETT	MIDSE	35701	1398468	2.6%	4308	10.77	3575	0.06
SOMERVILLE	MIDSE	76210	1398468	5.4%	9197	22.99	7630	0.13
				TOTAL MET.BOSTON		316.71	105106	1.74
WORCESTER	WORCE	169759	709705	23.9%	20486	51.22	16997	0.28
SPRINGFIELD	HAMPD	156983	456310	34.4%	18944	47.36	15718	0.26
LOWELL	MIDSE	103439	1398468	7.4%	12483	31.21	10357	0.17
WALTHAM	MIDSE	57878	1398468	4.1%	6985	17.46	5795	0.10

COMMENTS: NO SUMMER ACTIVITY, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

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nov10 revised original  TABLE B.4-4   RESIDENTIAL NATURAL GAS EMISSIONS 1990
resngas
    SCC :        21-04-006-000
                 STATIONARY SOURCE FUEL COMBUSTION
                 RESIDENTIAL :   NATURAL GAS

   STATE ACTIVITY LEVEL :              107 B.CU FT    * 1000          107000 M.CU FT

   COUNTY ACTIVITY LEVEL :            ANNUAL     OZ PO      CO PC       VOC TPY   VOC PO        NOX TPY  NOX PO        CO TPY  CO PO  CO PC
   ---------------------            ACTIVITY    ACTIV ACTIV 83%         EM.EF     TPSD         EM.FAC    TPSD        EM.FAC   TPSD   TPWD
   COUNTIES   POP 1990     %         M CU FT  *.3 * 92  151/182  5.3LB/MCUFT      /92  100LB/MCUFT     /92   20LB/MCUFT    /92   /151
   ========  =========  ====         =======   =======  =======     ========   =====      ========  ======     ======== =====  =====
 1 BARNSTABLE   186605   3.1%           3319     250.9   2334.0         8.79    0.01        165.94    0.14        33.19  0.03  0.155
 2 BERKSHIRE    139352   2.3%           2478     187.4   1743.0         6.57    0.01        123.92    0.10        24.78  0.02  0.115
 3 BRISTOL      506325   8.4%           9005     680.9   6333.0        23.86    0.02        450.24    0.37        90.05  0.07  0.419
 4 DUKES         11639   0.2%            207      15.7    145.6         0.55    0.00         10.35    0.01         2.07  0.00  0.010
 5 ESSEX        670080  11.1%          11917     901.1   8381.2        31.58    0.03        595.86    0.49       119.17  0.10  0.555
 6 FRANKLIN      70092   1.2%           1247      94.3    876.7         3.30    0.00         62.33    0.05        12.47  0.01  0.058
 7 HAMPDEN      456310   7.6%           8115     613.7   5707.4        21.51    0.02        405.77    0.33        81.15  0.07  0.378
 8 HAMPSHIRE    146568   2.4%           2607     197.1   1833.2         6.91    0.01        130.33    0.11        26.07  0.02  0.121
 9 MIDDLESEX   1398468  23.2%          24871    1880.7  17491.7        65.91    0.05       1243.56    1.02       248.71  0.20  1.158
10 NANTUCKET      6012   0.1%            107       8.1     75.2         0.28    0.00          5.35    0.00         1.07  0.00  0.005
11 NORFOLK      616087  10.2%          10957     828.5   7705.8        29.04    0.02        547.84    0.45       109.57  0.09  0.510
12 PLYMOUTH     435276   7.2%           7741     585.4   5444.3        20.51    0.02        387.06    0.32        77.41  0.06  0.361
13 SUFFOLK      663906  11.0%          11807     892.8   8304.0        31.29    0.03        590.37    0.49       118.07  0.10  0.550
14 WORCESTER    709705  11.8%          12622     954.4   8876.8        33.45    0.03        631.09    0.52       126.22  0.10  0.588

   STATE       6016425 100.0%         107000    8091.0  75251.8       283.55    0.23       5350.00    4.40      1070.00  0.88  4.984

ACTIVITY LEVEL UNITS :          MILLION CU FT                                                                      ANNUAL ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :        BURNED                          NON-ATT   COUNTY       TOWN  COUNTY       %TOWN  ACTIV CO TPY   ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                           TOWNS                POPUL   POPUL       /CNTY  MCUFT EF20LB   MCUFT   /151
                                                                =======   ======    ======== =======     ======= ====== ====== ======= ======
PEAK OZ DAYS/WEEK :              7                               BOSTON   SUFF25      574283  663906       86.5% 10213 102.13    7183  0.476
PEAK OZ WEEKS/YEAR :             52       PO THRUPUT : 7.6%   CAMBRIDGE   MIDX21       95802 1398468        6.9%  1704  17.04    1198  0.079
                                                                 QUINCY   NORF23       84985  616087       13.8%  1511  15.11    1063  0.070
PEAK CO DAYS/WEEK :              7                              MEDFORD   MIDX21       57407 1398468        4.1%  1021  10.21     718  0.048
PEAK CO WEEKS/YEAR :             52       PC THRUPUT : 42 %      REVERE   SUFF25       42786  663906        6.4%   761   7.61     535  0.035
                                                                 MALDEN   MIDX21       53884 1398468        3.9%   958   9.58     674  0.045
EMISSION FACTORS :        VOC:   5.3                            CHELSEA   SUFF25       28710  663906        4.3%   511   5.11     359  0.024
                          NOX:   100.0                          EVERETT   MIDX21       35701 1398468        2.6%   635   6.35     447  0.030
                          CO:    20.0                        SOMERVILLE   MIDX21       76210 1398468        5.4%  1355  13.55     953  0.063
EMISSION FACTOR UNITS :          LB/MCUFT  AP-42 TABLE 1.4-1                                       TOTAL MET.BOSTON    186.70   13130  0.870
                                                              WORCESTER   WORC26      169759  709705       23.9%  3019  30.19    2123  0.141
RULE EFFECTIVENESS :             N/A                        SPRINGFIELD   HAMD19      156983  456310       34.4%  2792  27.92    1963  0.130
RULE PENETRATION :               N/A                             LOWELL   MIDX21      103439 1398468        7.4%  1840  18.40    1294  0.086
SIP RULE :                       NO                             WALTHAM   MIDX21       57878 1398468        4.1%  1029  10.29     724  0.048

PO INTERVAL :                    1 HR
PC INTERVAL :                    8 HR

WEEKDAY:        70 %      SAT : 15 %       SUN :      15 %

COMMENTS:      PEAK OZONE JUNE TO AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT DEC-FEB FOR AMS INPUT
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                TABLE B.4-5   RESIDENTIAL WOOD STOVE EMISSIONS 1990
reswstov
    SCC :       21-04-008-051
               STATIONARY SOURCE FUEL COMBUSTION
               RESIDENTIAL :   WOODSTOVES CONVENTIONAL

   STATE ACTIVITY LEVEL :          900731 TONS WOOD

   COUNTY ACTIVITY LEVEL :         ANNUAL   OZ PO    CO PC      VOC TPY  VOC PO      NOX TPY  NOX PO     CO TPY   CO PO   CO PC
   ---------------------          ACTIVITY  ACTIV ACTIV 83%      EM.FAC    TPSD       EM.FAC    TPSD     EM.FAC    TPSD    TPWD
   COUNTIES   POP 1990     %     TONS WOOD   * 0     151/182  28 LB/TON * 0 /92   2.8LB/TON * 0 /92  230.8LB/TON *0/92    /151
   ========  =========  ====      =======  =======  =======   ========  ======    ========  ======    ======== =====   =====
 1 BARNSTABLE   186605   3.1%       27937      0.0    23179     391.12    0.00       39.11    0.00     3223.93  0.00   17.71
 2 BERKSHIRE    139352   2.3%       20863      0.0    17309     292.08    0.00       29.21    0.00     2407.55  0.00   13.23
 3 BRISTOL      506325   8.4%       75803      0.0    62891    1061.24    0.00      106.12    0.00     8747.66  0.00   48.06
 4 DUKES         11639   0.2%        1742      0.0     1446      24.39    0.00        2.44    0.00      201.08  0.00    1.10
 5 ESSEX        670080  11.1%      100319      0.0    83232    1404.47    0.00      140.45    0.00    11576.81  0.00   63.61
 6 FRANKLIN      70092   1.2%       10494      0.0     8706     146.91    0.00       14.69    0.00     1210.96  0.00    6.65
 7 HAMPDEN      456310   7.6%       68315      0.0    56679     956.41    0.00       95.64    0.00     7883.56  0.00   43.32
 8 HAMPSHIRE    146568   2.4%       21943      0.0    18205     307.20    0.00       30.72    0.00     2532.22  0.00   13.91
 9 MIDDLESEX   1398468  23.2%      209367      0.0   173706    2931.14    0.00      293.11    0.00    24161.00  0.00  132.75
10 NANTUCKET      6012   0.1%         900      0.0      747      12.60    0.00        1.26    0.00      103.87  0.00    0.57
11 NORFOLK      616087  10.2%       92236      0.0    76525    1291.30    0.00      129.13    0.00    10643.99  0.00   58.48
12 PLYMOUTH     435276   7.2%       65166      0.0    54066     912.32    0.00       91.23    0.00     7520.16  0.00   41.32
13 SUFFOLK      663906  11.0%       99395      0.0    82465    1391.53    0.00      139.15    0.00    11470.15  0.00   63.02
14 WORCESTER    709705  11.8%      106251      0.0    88154    1487.52    0.00      148.75    0.00    12261.41  0.00   67.37

   STATE       6016425 100.0%      900731      0.0   747310   12610.23    0.00     1261.02    0.00   103944.36  0.00  571.12

ACTIVITY LEVEL UNITS :         TONS                                                                       ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :       BURNED                      NON-ATT    COUNTY        TOWN  COUNTY       %TOWN  ACTIV CO TPY   ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                      TOWNS                 POPUL   POPUL       /CNTY   TONS EF230.8   TONS  /151
                                                           =======    ======    ======== =======      ====== ====== ======  ======= ======
PEAK OZ DAYS/WEEK :             0                           BOSTON    SUFF25      574283  663906       86.5% 85977 9921.75   71333  54.52
PEAK OZ WEEKS/YEAR :            0        PO THRUPUT : 0%  CAMBRIDGE   MIDX21       95802 1398468        6.9% 14343 1655.15   11900   9.09
                                                            QUINCY    NORF23       84985  616087       13.8% 12723 1468.27   10556   8.07
PEAK CO DAYS/WEEK :             7                     50   MEDFORD    MIDX21       57407 1398468        4.1%  8595  991.81    7131   5.45
PEAK CO WEEKS/YEAR :            26       PC THRUPUT : 83%   REVERE    SUFF25       42786  663906        6.4%  6406  739.20    5315   4.06
                                                            MALDEN    MIDX21       53884 1398468        3.9%  8067  930.94    6693   5.12
EMISSION FACTORS :     VOC:     28.0                       CHELSEA    SUFF25       28710  663906        4.3%  4298  496.02    3566   2.73
                       NOX:     2.8                        EVERETT    MIDX21       35701 1398468        2.6%  5345  616.80    4434   3.39
                       CO:      230.8                    SOMERVILLE   MIDX21       76210 1398468        5.4% 11410 1316.66    9466   7.23
EMISSION FACTOR UNITS :         LB/TON   AP-42 TABLE 1.10-1                                       TOTAL MET.BOSTON   18136.6  130393  99.65
                                                          WORCESTER   WORC26      169759  709705       23.9% 25415 2932.89   21086  16.11
RULE EFFECTIVENESS :            N/A                     SPRINGFIELD   HAMD19      156983  456310       34.4% 23502 2712.16   19499  14.90
RULE PENETRATION :              N/A                          LOWELL   MIDX21      103439 1398468        7.4% 15486 1787.09   12848   9.82
SIP RULE :                      NO                          WALTHAM   MIDX21       57878 1398468        4.1%  8665  999.94    7189   5.49

PO INTERVAL :                   1 HR
PC INTERVAL :                   8 HR

WEEKDAY:       70 %      SAT : 15 %      SUN :      15 %

COMMENTS:    NO SUMMER ACTIVITY, WINTER OCTOBER TO MARCH, PC THRUPUT OCT-FEB (TABLE C.4 MOBILE SECTION) DEC - FEB (AMS INPUT)
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                    TABLE B.4-6   RESIDENTIAL WOOD FIREPLACE EMISSIONS 1990
reswfire
   SCC :       21-04-008-001
              STATIONARY SOURCE FUEL COMBUSTION
              RESIDENTIAL :  WOOD FIREPLACES

   STATE ACTIVITY LEVEL :          171568 TONS WOOD 16 %

   COUNTY ACTIVITY LEVEL :            ANNUAL    OZ PO    CO PC       VOC TPY  VOC PO      NOX TPY  NOX PO       CO TPY  CO PO    CO PC
    ---------------------           ACTIVITY    ACTIV ACTIV 83%      EM.FAC    TPSD       EM.FAC    TPSD       EM.FAC   TPSD     TPWD
   COUNTIES   POP 1990     %       TONS WOOD    * 0     151/182    26 LB/TON * 0 /92    1.8LB/TON * 0 /92   122.2LB/TON *0/92     /151
   ========  =========  ====         =======  =======  =======      ========  ======     ========  ======      ======== =====    =====
 1 BARNSTABLE  186605   3.1%            5321      0.0     4415         69.18    0.00         4.79    0.00        325.13   0.00     1.79
 2 BERKSHIRE   139352   2.3%            3974      0.0     3297         51.66    0.00         3.58    0.00        242.80   0.00     1.33
 3 BRISTOL     506325   8.4%           14439      0.0    11979        187.70    0.00        12.99    0.00        882.20   0.00     4.85
 4 DUKES        11639   0.2%             332      0.0      275          4.31    0.00         0.30    0.00         20.28   0.00     0.11
 5 ESSEX       670080  11.1%           19108      0.0    15854        248.41    0.00        17.20    0.00       1167.52   0.00     6.41
 6 FRANKLIN     70092   1.2%            1999      0.0     1658         25.98    0.00         1.80    0.00        122.13   0.00     0.67
 7 HAMPDEN     456310   7.6%           13012      0.0    10796        169.16    0.00        11.71    0.00        795.06   0.00     4.37
 8 HAMPSHIRE   146568   2.4%            4180      0.0     3468         54.34    0.00         3.76    0.00        255.37   0.00     1.40
 9 MIDDLESEX  1398468  23.2%           39880      0.0    33087        518.43    0.00        35.89    0.00       2436.64   0.00    13.39
10 NANTUCKET     6012   0.1%             171      0.0      142          2.23    0.00         0.15    0.00         10.48   0.00     0.06
11 NORFOLK     616087  10.2%           17569      0.0    14576        228.39    0.00        15.81    0.00       1073.45   0.00     5.90
12 PLYMOUTH    435276   7.2%           12413      0.0    10298        161.36    0.00        11.17    0.00        758.41   0.00     4.17
13 SUFFOLK     663906  11.0%           18932      0.0    15708        246.12    0.00        17.04    0.00       1156.77   0.00     6.36
14 WORCESTER   709705  11.8%           20238      0.0    16791        263.10    0.00        18.21    0.00       1236.56   0.00     6.79

   STATE      6016425 100.0%          171568      0.0   142345       2230.38    0.00       154.41    0.00      10482.80   0.00    57.60

 ACTIVITY LEVEL UNITS :         TONS                                                                         ANNUAL  ANNUAL PEAK CO PEAK CO
 ACTIVITY LEVEL PROCESS :       BURNED                      NON-ATT   COUNTY        TOWN  COUNTY       %TOWN  ACTIV CO TPY   ACTIV   TPWD
 ACTIVITY LEVEL METHOD :                                      TOWNS                POPUL   POPUL       /CNTY   TONS EF122.2   TONS  /151
                                                            =======   ======    ======== =======      ====== ====== ======  ======= ======
 PEAK OZ DAYS/WEEK :             0                           BOSTON   SUFF25      574283  663906       86.5% 16377 1000.61   13587   5.50
 PEAK OZ WEEKS/YEAR :            0          PO THRUPUT : 0%  CAMBRIDGE MIDX21      95802 1398468        6.9%  2732  166.92    2267   0.92
                                                             QUINCY   NORF23      84985  616087       13.8%  2423  148.07    2011   0.81
 PEAK CO DAYS/WEEK :             7                    50     MEDFORD  MIDX21      57407 1398468        4.1%  1637  100.02    1358   0.55
 PEAK CO WEEKS/YEAR :            26         PC THRUPUT : 83%   REVERE   SUFF25      42786  663906        6.4%  1220   74.55    1012   0.41
                                                             MALDEN   MIDX21      53884 1398468        3.9%  1537   93.89    1275   0.52
 EMISSION FACTORS :      VOC:    26.0                        CHELSEA  SUFF25      28710  663906        4.3%   819   50.02     679   0.27
                         NOX:    1.8                         EVERETT  MIDX21      35701 1398468        2.6%  1018   62.20     845   0.34
                         CO:     122.2                     SOMERVILLE MIDX21      76210 1398468        5.4%  2173  132.79    1803   0.73
 EMISSION FACTOR UNITS :         LB/TON     AP-42 TABLE 1.9-1                               TOTAL MET.BOSTON     1829.1   24837  10.05
                                                           WORCESTER  WORC26     169759  709705       23.9%  4841  295.78    4016   1.63
 RULE EFFECTIVENESS :            N/A                     SPRINGFIELD  HAMD19     156983  456310       34.4%  4477  273.52    3714   1.50
 RULE PENETRATION :              N/A                          LOWELL  MIDX21     103439 1398468        7.4%  2950  180.23    2447   0.99
 SIP RULE :                      NO                          WALTHAM  MIDX21      57878 1398468        4.1%  1650  100.84    1369   0.55

 PO INTERVAL :                   1 HR
 PC INTERVAL :                   8 HR

 WEEKDAY:          70 %      SAT : 15 %      SUN :      15 %

 COMMENTS:     NO SUMMER ACTIVITY, WINTER OCTOBER TO MARCH, PC THRUPUT OCT-FEB (TABLE C.4 MOBILE SECTION) (DEC - FEB AMS INPUT)
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APPENDIX

TABLE B.4-7 RESIDENTIAL KEROSENE EMISSIONS 1990

reskeros
SCC : 21-04-011-000
STATIONARY SOURCE FUEL COMBUSTION
RESIDENTIAL : KEROSENE

STATE ACTIVITY LEVEL : 6846 TH.GALLS (163 T.BARRLS * 42)

COUNTY ACTIVITY LEVEL : COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV 4 %	CO PC ACTIVITY 75%	VOC TPY EM.FAC 32.1 LB/TGL	VOC PO TPSD /92	NOX TPY EM.FAC 469LB/T.GL	NOX PO TPSD /92	CO TPY EM.FAC 102LB/T.GL	CO PO TPSD /92	CO PC TPWD /151
1 BARNSTABLE	186605	3.1%	212	8.5	159	3.41	0.00	49.79	0.02	10.83	0.00	0.05
2 BERKSHIRE	139352	2.3%	159	6.3	119	2.54	0.00	37.18	0.02	8.09	0.00	0.04
3 BRISTOL	506325	8.4%	576	23.0	432	9.25	0.00	135.10	0.06	29.38	0.01	0.15
4 DUKES	11639	0.2%	13	0.5	10	0.21	0.00	3.11	0.00	0.68	0.00	0.00
5 ESSEX	670080	11.1%	762	30.5	572	12.24	0.01	178.80	0.08	38.89	0.02	0.19
6 FRANKLIN	70092	1.2%	80	3.2	60	1.28	0.00	18.70	0.01	4.07	0.00	0.02
7 HAMPDEN	456310	7.6%	519	20.8	389	8.33	0.00	121.76	0.05	26.48	0.01	0.13
8 HAMPSHIRE	146568	2.4%	167	6.7	125	2.68	0.00	39.11	0.02	8.51	0.00	0.04
9 MIDDLESEX	1398468	23.2%	1591	63.7	1193	25.54	0.01	373.16	0.16	81.16	0.04	0.40
10 NANTUCKET	6012	0.1%	7	0.3	5	0.11	0.00	1.60	0.00	0.35	0.00	0.00
11 NORFOLK	616087	10.2%	701	28.0	526	11.25	0.00	164.39	0.07	35.75	0.02	0.18
12 PLYMOUTH	435276	7.2%	495	19.8	371	7.95	0.00	116.15	0.05	25.26	0.01	0.13
13 SUFFOLK	663906	11.0%	755	30.2	567	12.12	0.01	177.15	0.08	38.53	0.02	0.19
14 WORCESTER	709705	11.8%	808	32.3	606	12.96	0.01	189.37	0.08	41.19	0.02	0.20
STATE	6016425	100.0%	6846	273.8	5135	109.88	0.05	1605.39	0.70	349.15	0.15	1.73

ACTIVITY LEVEL UNITS : TONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 4 %

PEAK CO DAYS/WEEK : 7
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~75~~ 43.4 %

EMISSION FACTORS : VOC: 32.1
NOX: 469.0
CO: 102.2
EMISSION FACTOR UNITS : LB/T.GALLS NAPAP P.35

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: 70 % SAT : 15 % SUN : 15 %

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TONS	ANNUAL CO TPY EF102LB	PEAK CO ACTIV TONS	PEAK CO TPWD /151
BOSTON	SUFF25	574283	663906	86.5%	653	33.33	490	0.17
CAMBRIDGE	MIDX21	95802	1398468	6.9%	109	5.56	82	0.03
QUINCY	NORF23	84985	616087	13.8%	97	4.93	73	0.02
MEDFORD	MIDX21	57407	1398468	4.1%	65	3.33	49	0.02
REVERE	SUFF25	42786	663906	6.4%	49	2.48	37	0.01
MALDEN	MIDX21	53884	1398468	3.9%	61	3.13	46	0.02
CHELSEA	SUFF25	28710	663906	4.3%	33	1.67	25	0.01
EVERETT	MIDX21	35701	1398468	2.6%	41	2.07	30	0.01
SOMERVILLE	MIDX21	76210	1398468	5.4%	87	4.42	65	0.02
TOTAL MET.BOSTON						60.92	896	0.30
WORCESTER	WORC26	169759	709705	23.9%	193	9.85	145	0.05
SPRINGFIELD	HAMD19	156983	456310	34.4%	179	9.11	134	0.05
LOWELL	MIDX21	103439	1398468	7.4%	118	6.00	88	0.03
WALTHAM	MIDX21	57878	1398468	4.1%	66	3.36	49	0.02

COMMENTS: NO SUMMER ACTIVITY, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

TABLE B.4-8 RESIDENTIAL LIQUID PETROLEUM GAS EMISSIONS 1990

reslpg
SCC : 21-04-007-000
STATIONARY SOURCE FUEL COMBUSTION
RESIDENTIAL : LIQUID PETROLEUM GAS

STATE ACTIVITY LEVEL : 57036 TH.GALLS (1358 T.BARRLS * 42)

COUNTY ACTIVITY LEVEL :

COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV /365*.3	CO PC ACTIVITY /365*1.7	VOC TPY EM.FAC .485LB/TGL	VOC PO TPSD /92	NOX TPY EM.FAC 9.1LB/T.GL	NOX PO TPSD /92	CO TPY EM.FAC 1.85LB/T.GL	CO PO TPSD /92	CO PC TPWD /151
1 BARNSTABLE	186605	3.1%	1769	134	1244	0.429	0.000	8.049	0.007	1.636	0.001	0.008
2 BERKSHIRE	139352	2.3%	1321	100	929	0.320	0.000	6.011	0.005	1.222	0.001	0.006
3 BRISTOL	506325	8.4%	4800	363	3376	1.164	0.001	21.840	0.018	4.440	0.004	0.021
4 DUKES	11639	0.2%	110	8	78	0.027	0.000	0.502	0.000	0.102	0.000	0.000
5 ESSEX	670080	11.1%	6352	480	4468	1.540	0.001	28.903	0.024	5.876	0.005	0.027
6 FRANKLIN	70092	1.2%	664	50	467	0.161	0.000	3.023	0.002	0.615	0.001	0.003
7 HAMPDEN	456310	7.6%	4326	327	3042	1.049	0.001	19.683	0.016	4.001	0.003	0.019
8 HAMPSHIRE	146568	2.4%	1389	105	977	0.337	0.000	6.322	0.005	1.285	0.001	0.006
9 MIDDLESEX	1398468	23.2%	13258	1002	9324	3.215	0.003	60.322	0.050	12.263	0.010	0.057
10 NANTUCKET	6012	0.1%	57	4	40	0.014	0.000	0.259	0.000	0.053	0.000	0.000
11 NORFOLK	616087	10.2%	5841	442	4108	1.416	0.001	26.574	0.022	5.402	0.004	0.025
12 PLYMOUTH	435276	7.2%	4126	312	2902	1.001	0.001	18.775	0.015	3.817	0.003	0.018
13 SUFFOLK	663906	11.0%	6294	476	4426	1.526	0.001	28.637	0.024	5.822	0.005	0.027
14 WORCESTER	709705	11.8%	6728	509	4732	1.632	0.001	30.613	0.025	6.223	0.005	0.029
STATE	6016425	100.0%	57036	4313	40113	13.831	0.011	259.514	0.213	52.758	0.043	0.246

ACTIVITY LEVEL UNITS : GALLONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 8 %

PEAK CO DAYS/WEEK : 7
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~70~~ 42 %

EMISSION FACTORS : VOC: .485
NOX: 9.1
CO: 1.85
EMISSION FACTOR UNITS : LB/T.GAL AP-42 TABLE 1.5-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV ~~TONS~~ TGL	ANNUAL CO TPY EF1.85LB	PEAK CO ACTIV TONS	PEAK CO TPWD /151
BOSTON	SUFF25	574283	663906	86.5%	5444	5.036	3829	0.023
CAMBRIDGE	MIDX21	95802	1398468	6.9%	908	0.840	639	0.004
QUINCY	NORF23	84985	616087	13.8%	806	0.745	567	0.003
MEDFORD	MIDX21	57407	1398468	4.1%	544	0.503	383	0.002
REVERE	SUFF25	42786	663906	6.4%	406	0.375	285	0.002
MALDEN	MIDX21	53884	1398468	3.9%	511	0.473	359	0.002
CHELSEA	SUFF25	28710	663906	4.3%	272	0.252	191	0.001
EVERETT	MIDX21	35701	1398468	2.6%	338	0.313	238	0.001
SOMERVILLE	MIDX21	76210	1398468	5.4%	722	0.668	508	0.003
			TOTAL MET.BOSTON			9.205	6999	0.043
WORCESTER	WORC26	169759	709705	23.9%	1609	1.489	1132	0.007
SPRINGFIELD	HAMD19	156983	456310	34.4%	1488	1.377	1047	0.006
LOWELL	MIDX21	103439	1398468	7.4%	981	0.907	690	0.004
WALTHAM	MIDX21	57878	1398468	4.1%	549	0.508	386	0.002

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: 70 % SAT : 15 % SUN : 15 %

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

TABLE B.4-7 RESIDENTIAL KEROSENE EMISSIONS 1990

reskeros

SCC : 21-04-011-000
STATIONARY SOURCE FUEL COMBUSTION
RESIDENTIAL : KEROSENE

STATE ACTIVITY LEVEL : 6846 TH.GALLS (163 T.BARRLS * 42)

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV 4 %	CO PC ACTIVITY 75%	VOC TPY EM.FAC 32.1 LB/TGL	VOC PO TPSD /92	NOX TPY EM.FAC 469LB/T.GL	NOX PO TPSD /92	CO TPY EM.FAC 102LB/T.GL	CO PO TPSD /92	CO PC TPWD /151
1	BARNSTABLE	186605	3.1%	212	8.5	159	3.41	0.00	49.79	0.02	10.83	0.00	0.05
2	BERKSHIRE	139352	2.3%	159	6.3	119	2.54	0.00	37.18	0.02	8.09	0.00	0.04
3	BRISTOL	506325	8.4%	576	23.0	432	9.25	0.00	135.10	0.06	29.38	0.01	0.15
4	DUKES	11639	0.2%	13	0.5	10	0.21	0.00	3.11	0.00	0.68	0.00	0.00
5	ESSEX	670080	11.1%	762	30.5	572	12.24	0.01	178.80	0.08	38.89	0.02	0.19
6	FRANKLIN	70092	1.2%	80	3.2	60	1.28	0.00	18.70	0.01	4.07	0.00	0.02
7	HAMPDEN	456310	7.6%	519	20.8	389	8.33	0.00	121.76	0.05	26.48	0.01	0.13
8	HAMPSHIRE	146568	2.4%	167	6.7	125	2.68	0.00	39.11	0.02	8.51	0.00	0.04
9	MIDDLESEX	1398468	23.2%	1591	63.7	1193	25.54	0.01	373.16	0.16	81.16	0.04	0.40
10	NANTUCKET	6012	0.1%	7	0.3	5	0.11	0.00	1.60	0.00	0.35	0.00	0.00
11	NORFOLK	616087	10.2%	701	28.0	526	11.25	0.00	164.39	0.07	35.75	0.02	0.18
12	PLYMOUTH	435276	7.2%	495	19.8	371	7.95	0.00	116.15	0.05	25.26	0.01	0.13
13	SUFFOLK	663906	11.0%	755	30.2	567	12.12	0.01	177.15	0.08	38.53	0.02	0.19
14	WORCESTER	709705	11.8%	808	32.3	606	12.96	0.01	189.37	0.08	41.19	0.02	0.20
	STATE	6016425	100.0%	6846	273.8	5135	109.88	0.05	1605.39	0.70	349.15	0.15	1.73

ACTIVITY LEVEL UNITS : TONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 4 %

PEAK CO DAYS/WEEK : 7
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~75~~ 43.4 %

EMISSION FACTORS : VOC: 32.1
NOX: 469.0
CO: 102.2
EMISSION FACTOR UNITS : LB/T.GALLS NAPAP P.35

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: 70 % SAT : 15 % SUN : 15 %

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TONS	ANNUAL CO TPY EF102LB	PEAK CO ACTIV TONS	PEAK CO TPWD /151
BOSTON	SUFF25	574283	663906	86.5%	653	33.33	490	0.17
CAMBRIDGE	MIDX21	95802	1398468	6.9%	109	5.56	82	0.03
QUINCY	NORF23	84985	616087	13.8%	97	4.93	73	0.02
MEDFORD	MIDX21	57407	1398468	4.1%	65	3.33	49	0.02
REVERE	SUFF25	42786	663906	6.4%	49	2.48	37	0.01
MALDEN	MIDX21	53884	1398468	3.9%	61	3.13	46	0.02
CHELSEA	SUFF25	28710	663906	4.3%	33	1.67	25	0.01
EVERETT	MIDX21	35701	1398468	2.6%	41	2.07	30	0.01
SOMERVILLE	MIDX21	76210	1398468	5.4%	87	4.42	65	0.02
				TOTAL MET.BOSTON		60.92	896	0.30
WORCESTER	WORC26	169759	709705	23.9%	193	9.85	145	0.05
SPRINGFIELD	HAMD19	156983	456310	34.4%	179	9.11	134	0.05
LOWELL	MIDX21	103439	1398468	7.4%	118	6.00	88	0.03
WALTHAM	MIDX21	57878	1398468	4.1%	66	3.36	49	0.02

COMMENTS: NO SUMMER ACTIVITY, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

TABLE B.4-8 RESIDENTIAL LIQUID PETROLEUM GAS EMISSIONS 1990

reslpg
SCC : 21-04-007-000
STATIONARY SOURCE FUEL COMBUSTION
RESIDENTIAL : LIQUID PETROLEUM GAS

STATE ACTIVITY LEVEL : 57036 TH.GALLS (1358 T.BARRLS * 42)

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV /365*.3	CO PC ACTIVITY /365*1.7	VOC TPY EM.FAC .485LB/TGL	VOC PO TPSD /92	NOX TPY EM.FAC 9.1LB/T.GL	NOX PO TPSD /92	CO TPY EM.FAC 1.85LB/T.GL	CO PO TPSD /92	CO PC TPWD /151
1	BARNSTABLE	186605	3.1%	1769	134	1244	0.429	0.000	8.049	0.007	1.636	0.001	0.008
2	BERKSHIRE	139352	2.3%	1321	100	929	0.320	0.000	6.011	0.005	1.222	0.001	0.006
3	BRISTOL	506325	8.4%	4800	363	3376	1.164	0.001	21.840	0.018	4.440	0.004	0.021
4	DUKES	11639	0.2%	110	8	78	0.027	0.000	0.502	0.000	0.102	0.000	0.000
5	ESSEX	670080	11.1%	6352	480	4468	1.540	0.001	28.903	0.024	5.876	0.005	0.027
6	FRANKLIN	70092	1.2%	664	50	467	0.161	0.000	3.023	0.002	0.615	0.001	0.003
7	HAMPDEN	456310	7.6%	4326	327	3042	1.049	0.001	19.683	0.016	4.001	0.003	0.019
8	HAMPSHIRE	146568	2.4%	1389	105	977	0.337	0.000	6.322	0.005	1.285	0.001	0.006
9	MIDDLESEX	1398468	23.2%	13258	1002	9324	3.215	0.003	60.322	0.050	12.263	0.010	0.057
10	NANTUCKET	6012	0.1%	57	4	40	0.014	0.000	0.259	0.000	0.053	0.000	0.000
11	NORFOLK	616087	10.2%	5841	442	4108	1.416	0.001	26.574	0.022	5.402	0.004	0.025
12	PLYMOUTH	435276	7.2%	4126	312	2902	1.001	0.001	18.775	0.015	3.817	0.003	0.018
13	SUFFOLK	663906	11.0%	6294	476	4426	1.526	0.001	28.637	0.024	5.822	0.005	0.027
14	WORCESTER	709705	11.8%	6728	509	4732	1.632	0.001	30.613	0.025	6.223	0.005	0.029
	STATE	6016425	100.0%	57036	4313	40113	13.831	0.011	259.514	0.213	52.758	0.043	0.246

ACTIVITY LEVEL UNITS : GALLONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 7
PEAK OZ WEEKS/YEAR : 52 PO THRUPUT : 8 %

PEAK CO DAYS/WEEK : 7
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~70~~ 42 %

EMISSION FACTORS : VOC: .485
NOX: 9.1
CO: 1.85
EMISSION FACTOR UNITS : LB/T.GAL AP-42 TABLE 1.5-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: 70 % SAT : 15 % SUN : 15 %

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV ~~TONS~~ TGL	ANNUAL CO TPY EF1.85LB	PEAK CO ACTIV TONS	PEAK CO TPWD /151
BOSTON	SUFF25	574283	663906	86.5%	5444	5.036	3829	0.023
CAMBRIDGE	MIDX21	95802	1398468	6.9%	908	0.840	639	0.004
QUINCY	NORF23	84985	616087	13.8%	806	0.745	567	0.003
MEDFORD	MIDX21	57407	1398468	4.1%	544	0.503	383	0.002
REVERE	SUFF25	42786	663906	6.4%	406	0.375	285	0.002
MALDEN	MIDX21	53884	1398468	3.9%	511	0.473	359	0.002
CHELSEA	SUFF25	28710	663906	4.3%	272	0.252	191	0.001
EVERETT	MIDX21	35701	1398468	2.6%	338	0.313	238	0.001
SOMERVILLE	MIDX21	76210	1398468	5.4%	722	0.668	508	0.003
				TOTAL MET.BOSTON		9.205	6999	0.043
WORCESTER	WORC26	169759	709705	23.9%	1609	1.489	1132	0.007
SPRINGFIELD	HAMD19	156983	456310	34.4%	1488	1.377	1047	0.006
LOWELL	MIDX21	103439	1398468	7.4%	981	0.907	690	0.004
WALTHAM	MIDX21	57878	1398468	4.1%	549	0.508	386	0.002

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

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                    TABLE B.4-9   COMMERCIAL BITUMINOUS COAL EMISSIONS 1990
comBcoal
40 SCC :      21-03-002-000
              STATIONARY SOURCE FUEL COMBUSTION
              COMMERCIAL      BITUMINOUS COAL

  STATE ACTIVITY LEVEL :       14,609      TONS      (22,000 - 7,391 FROM SSEIS POINT SOURCES)
                                                /72      /120
  COUNTY ACTIVITY LEVEL :               ANNUAL   OZ PO    CO PC    VOC TPY  VOC PO    NOX TPY  NOX PO    CO TPY  CO PO  CO PC
  ---------------------               ACTIVITY   ACTIV  ACTIVITY    EM.FAC   TPSD     EM.FAC    TPSD    EM.FAC   TPSD   TPWD
  COUNTIES   POP 1990     %               TONS /312*.6 /312*1.4 1.3LB/TON    /72  9.5LB/TON    /72  11LB/TON    /72   /120
  ========  =========  ====            ======= ======= =======  ========  ======   ========  ======  ======== =====  =====
 1 BARNSTABLE   186605   3.1%            453      63     244      0.29   0.001       2.15   0.004      2.49 0.005  0.011
 2 BERKSHIRE    139352   2.3%            338      47     182      0.22   0.000       1.61   0.003      1.86 0.004  0.008
 3 BRISTOL      506325   8.4%           1229     170     662      0.80   0.002       5.84   0.011      6.76 0.013  0.030
 4 DUKES         11639   0.2%             28       4      15      0.02   0.000       0.13   0.000      0.16 0.000  0.001
 5 ESSEX        670080  11.1%           1627     225     876      1.06   0.002       7.73   0.015      8.95 0.017  0.040
 6 FRANKLIN      70092   1.2%            170      24      92      0.11   0.000       0.81   0.002      0.94 0.002  0.004
 7 HAMPDEN      456310   7.6%           1108     153     597      0.72   0.001       5.26   0.010      6.09 0.012  0.027
 8 HAMPSHIRE    146568   2.4%            356      49     192      0.23   0.000       1.69   0.003      1.96 0.004  0.009
 9 MIDDLESEX   1398468  23.2%           3396     470    1828      2.21   0.004      16.13   0.031     18.68 0.036  0.084
10 NANTUCKET      6012   0.1%             15       2       8      0.01   0.000       0.07   0.000      0.08 0.000  0.000
11 NORFOLK      616087  10.2%           1496     207     806      0.97   0.002       7.11   0.014      8.23 0.016  0.037
12 PLYMOUTH     435276   7.2%           1057     146     569      0.69   0.001       5.02   0.010      5.81 0.011  0.026
13 SUFFOLK      663906  11.0%           1612     223     868      1.05   0.002       7.66   0.015      8.87 0.017  0.040
14 WORCESTER    709705  11.8%           1723     239     928      1.12   0.002       8.19   0.016      9.48 0.018  0.043

   STATE       6016425 100.0%          14609    2023    7866      9.50   0.018      69.39   0.133     80.35 0.155  0.361

ACTIVITY LEVEL UNITS :        TONS                                                                 ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                     NON-ATT  COUNTY      TOWN  COUNTY     %TOWN  ACTIV CO TPY   ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                    TOWNS             POPUL   POPUL     /CNTY   TONS EF 11LB   TONS  /120
                                                         ======= ======   ======== =======    ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :           6                           BOSTON SUFF25     574283  663906     86.5%   1394    7.67     751  0.034
PEAK OZ WEEKS/YEAR :          ~~12~~52     PO THRUPUT : 14%    CAMBRIDGE MIDX21      95802 1398468      6.9%    233    1.28     125  0.006
                                                          QUINCY NORF23      84985  616087     13.8%    206    1.13     111  0.005
PEAK CO DAYS/WEEK :           6                    35    MEDFORD MIDX21      57407 1398468      4.1%    139    0.77      75  0.003
PEAK CO WEEKS/YEAR :          ~~20~~52     PC THRUPUT : ~~54~~ %   REVERE SUFF25      42786  663906      6.4%    104    0.57      56  0.003
                                                          MALDEN MIDX21      53884 1398468      3.9%    131    0.72      70  0.003
EMISSION FACTORS :      VOC:  1.3                        CHELSEA SUFF25      28710  663906      4.3%     70    0.38      38  0.002
                        NOX:  9.5                        EVERETT MIDX21      35701 1398468      2.6%     87    0.48      47  0.002
                        CO:   11.0                    SOMERVILLE MIDX21      76210 1398468      5.4%    185    1.02     100  0.005
EMISSION FACTOR UNITS :       LB/TON     AP-42 TABLE 1.1-1                            TOTAL MET.BOSTON      14.02    1373  0.063
                                                       WORCESTER WORC26     169759  709705     23.9%    412    2.27     222  0.010
RULE EFFECTIVENESS :          N/A                    SPRINGFIELD HAMD19     156983  456310     34.4%    381    2.10     205  0.009
RULE PENETRATION :            N/A                         LOWELL MIDX21     103439 1398468      7.4%    251    1.38     135  0.006
SIP RULE :                    NO                         WALTHAM MIDX21      57878 1398468      4.1%    141    0.77      76  0.003

PO INTERVAL :                 1 HR
PC INTERVAL :                 8 HR
                 3              7
WEEKDAY:        8~~6~~%     SAT : 1~~4~~%       SUN :      0%
                                                                  DEC
COMMENTS:    SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~-FEB (TABLE C.4 MOBILE SECTION)
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REVISED

TABLE B.4-10 COMMERCIAL ANTHRACITE COAL EMISSIONS 1990

comAcoal
SCC : 21-03-001-000
STATIONARY SOURCE FUEL COMBUSTION
COMMERCIAL ANTHRACITE COAL

STATE ACTIVITY LEVEL : 12,000 TONS

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TONS	OZ PO ACTIV /312*.6	CO PC ACTIVITY /312*1.4 *.75	VOC TPY EM.FAC 1.3LB/TON	VOC PO TPSD /72	NOX TPY EM.FAC 10LB/TON	NOX PO TPSD /72	CO TPY EM.FAC 0.6LB/TON	CO PO TPSD /72	CO PC TPWD /120
1	BARNSTABLE	186605	3.1%	372	52	200	0.24	0.000	1.86	0.003	0.11	0.000	0.001
2	BERKSHIRE	139352	2.3%	278	38	150	0.18	0.000	1.39	0.002	0.08	0.000	0.000
3	BRISTOL	506325	8.4%	1010	140	544	0.66	0.001	5.05	0.007	0.30	0.001	0.001
4	DUKES	11639	0.2%	23	3	13	0.02	0.000	0.12	0.000	0.01	0.000	0.000
5	ESSEX	670080	11.1%	1337	185	720	0.87	0.002	6.68	0.010	0.40	0.001	0.002
6	FRANKLIN	70092	1.2%	140	19	75	0.09	0.000	0.70	0.001	0.04	0.000	0.000
7	HAMPDEN	456310	7.6%	910	126	490	0.59	0.001	4.55	0.007	0.27	0.001	0.001
8	HAMPSHIRE	146568	2.4%	292	40	157	0.19	0.000	1.46	0.002	0.09	0.000	0.000
9	MIDDLESEX	1398468	23.2%	2789	386	1502	1.81	0.003	13.95	0.020	0.84	0.002	0.004
10	NANTUCKET	6012	0.1%	12	2	6	0.01	0.000	0.06	0.000	0.00	0.000	0.000
11	NORFOLK	616087	10.2%	1229	170	662	0.80	0.002	6.14	0.009	0.37	0.001	0.002
12	PLYMOUTH	435276	7.2%	868	120	467	0.56	0.001	4.34	0.006	0.26	0.001	0.001
13	SUFFOLK	663906	11.0%	1324	183	713	0.86	0.002	6.62	0.009	0.40	0.001	0.002
14	WORCESTER	709705	11.8%	1416	196	762	0.92	0.002	7.08	0.010	0.42	0.001	0.002
	STATE	6016425	100.0%	12000	1662	6462	7.80	0.015	60.00	0.086	3.60	0.007	0.016

ACTIVITY LEVEL UNITS : TONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~ 52 PO THRUPUT : 14 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~54~~ 35 %

EMISSION FACTORS : VOC: 1.3
NOX: 10.0
CO: 0.6
EMISSION FACTOR UNITS : LB/TON AP-42 TABLE 1.2-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TONS	ANNUAL CO TPY EF 0.6LB	PEAK CO ACTIV TONS	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	1145	0.34	617	0.002
CAMBRIDGE	MIDX21	95802	1398468	6.9%	191	0.06	103	0.000
QUINCY	NORF23	84985	616087	13.8%	170	0.05	91	0.000
MEDFORD	MIDX21	57407	1398468	4.1%	115	0.03	62	0.000
REVERE	SUFF25	42786	663906	6.4%	85	0.03	46	0.000
MALDEN	MIDX21	53884	1398468	3.9%	107	0.03	58	0.000
CHELSEA	SUFF25	28710	663906	4.3%	57	0.02	31	0.000
EVERETT	MIDX21	35701	1398468	2.6%	71	0.02	38	0.000
SOMERVILLE	MIDX21	76210	1398468	5.4%	152	0.05	82	0.000
				TOTAL MET.BOSTON		0.63	1127	0.003
WORCESTER	WORC26	169759	709705	23.9%	339	0.10	182	0.000
SPRINGFIELD	HAMD19	156983	456310	34.4%	313	0.09	169	0.000
LOWELL	MIDX21	103439	1398468	7.4%	206	0.06	111	0.000
WALTHAM	MIDX21	57878	1398468	4.1%	115	0.03	62	0.000

WEEKDAY: 86% 3 SAT : 17% SUN : 0%

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

TABLE B.4-11 COMMERCIAL DISTILLATE OIL EMISSIONS 1990

comDoil
SCC : 21-03-004-000
STATIONARY SOURCE FUEL COMBUSTION
COMMERCIAL DISTILLATE OIL

STATE ACTIVITY LEVEL : 215,566 TH.GALLS (6,236 TH.BARRELS * 42 = 261,912 - SSEIS 46,346 TH.GALS)

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV /312*.6	CO PC ACTIVITY /312*1.4	VOC TPY EM.FAC .34LB/TGL	VOC PO TPSD /72	NOX TPY EM.FAC 20LB/TGL	NOX PO TPSD /72	CO TPY EM.FAC 5 LB/TGL	CO PO TPSD /72	CO PC TPWD /120
1	BARNSTABLE	186605	3.1%	6686	926	3600	1.14	0.002	66.86	0.129	16.71	0.032	0.075
2	BERKSHIRE	139352	2.3%	4993	691	2688	0.85	0.002	49.93	0.096	12.48	0.024	0.056
3	BRISTOL	506325	8.4%	18141	2512	9768	3.08	0.006	181.41	0.349	45.35	0.087	0.204
4	DUKES	11639	0.2%	417	58	225	0.07	0.000	4.17	0.008	1.04	0.002	0.005
5	ESSEX	670080	11.1%	24009	3324	12928	4.08	0.008	240.09	0.462	60.02	0.115	0.269
6	FRANKLIN	70092	1.2%	2511	348	1352	0.43	0.001	25.11	0.048	6.28	0.012	0.028
7	HAMPDEN	456310	7.6%	16349	2264	8804	2.78	0.005	163.49	0.314	40.87	0.079	0.183
8	HAMPSHIRE	146568	2.4%	5251	727	2828	0.89	0.002	52.51	0.101	13.13	0.025	0.059
9	MIDDLESEX	1398468	23.2%	50107	6938	26980	8.52	0.016	501.07	0.964	125.27	0.241	0.562
10	NANTUCKET	6012	0.1%	215	30	116	0.04	0.000	2.15	0.004	0.54	0.001	0.002
11	NORFOLK	616087	10.2%	22074	3056	11886	3.75	0.007	220.74	0.425	55.19	0.106	0.248
12	PLYMOUTH	435276	7.2%	15596	2159	8398	2.65	0.005	155.96	0.300	38.99	0.075	0.175
13	SUFFOLK	663906	11.0%	23787	3294	12809	4.04	0.008	237.87	0.457	59.47	0.114	0.267
14	WORCESTER	709705	11.8%	25428	3521	13692	4.32	0.008	254.28	0.489	63.57	0.122	0.285
				0									
	STATE	6016425	100.0%	215566	29848	116074	36.65	0.070	2155.66	4.146	538.92	1.036	2.418

ACTIVITY LEVEL UNITS : TH.GALLONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~ 52 PO THRUPUT : 14 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~54~~ 35 %

EMISSION FACTORS : VOC: .34
NOX: 20.0
CO: 5.0
EMISSION FACTOR UNITS : LB/TH.GAL AP-42 TABLE 1.3-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: ~~84~~ 83% SAT : ~~14~~ 17 % SUN : 0 %

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TH.GLS	ANNUAL CO TPY EF 5 LB	PEAK CO ACTIV TH.GALS	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	20576	51.44	11080	0.231
CAMBRIDGE	MIDX21	95802	1398468	6.9%	3433	8.58	1848	0.039
QUINCY	NORF23	84985	616087	13.8%	3045	7.61	1640	0.034
MEDFORD	MIDX21	57407	1398468	4.1%	2057	5.14	1108	0.023
REVERE	SUFF25	42786	663906	6.4%	1533	3.83	825	0.017
MALDEN	MIDX21	53884	1398468	3.9%	1931	4.83	1040	0.022
CHELSEA	SUFF25	28710	663906	4.3%	1029	2.57	554	0.012
EVERETT	MIDX21	35701	1398468	2.6%	1279	3.20	689	0.014
SOMERVILLE	MIDX21	76210	1398468	5.4%	2731	6.83	1470	0.031
				TOTAL MET.BOSTON		94.03	20253	0.422
WORCESTER	WORC26	169759	709705	23.9%	6082	15.21	3275	0.068
SPRINGFIELD	HAMD19	156983	456310	34.4%	5625	14.06	3029	0.063
LOWELL	MIDX21	103439	1398468	7.4%	3706	9.27	1996	0.042
WALTHAM	MIDX21	57878	1398468	4.1%	2074	5.18	1117	0.023

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

TABLE B.4-12 COMMERCIAL RESIDUAL OIL EMISSIONS 1990

comRoil
43 SCC : 21-03-005-000
STATIONARY SOURCE FUEL COMBUSTION
COMMERCIAL RESIDUAL OIL

STATE ACTIVITY LEVEL : 108,738 TH.GALLS (4,506 TH.BARRELS * 42 = 189,252 T.GALS - SSEIS POINT 80,514 T.GALS)

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	/72 OZ PO ACTIV /312*.6	/120 CO PC ACTIVITY /312*1.4	VOC TPY EM.FAC 1.13LB/TGL	VOC PO TPSD /72	NOX TPY EM.FAC 55 LB/TGL	NOX PO TPSD /72	CO TPY EM.FAC 5 LB/TGL	CO PO TPSD /72	CO PC TPWD /120
1	BARNSTABLE	186605	3.1%	3373	467	1816	1.91	0.004	92.75	0.178	8.43	0.016	0.038
2	BERKSHIRE	139352	2.3%	2519	349	1356	1.42	0.003	69.26	0.133	6.30	0.012	0.028
3	BRISTOL	506325	8.4%	9151	1267	4928	5.17	0.010	251.65	0.484	22.88	0.044	0.103
4	DUKES	11639	0.2%	210	29	113	0.12	0.000	5.78	0.011	0.53	0.001	0.002
5	ESSEX	670080	11.1%	12111	1677	6521	6.84	0.013	333.04	0.640	30.28	0.058	0.136
6	FRANKLIN	70092	1.2%	1267	175	682	0.72	0.001	34.84	0.067	3.17	0.006	0.014
7	HAMPDEN	456310	7.6%	8247	1142	4441	4.66	0.009	226.80	0.436	20.62	0.040	0.093
8	HAMPSHIRE	146568	2.4%	2649	367	1426	1.50	0.003	72.85	0.140	6.62	0.013	0.030
9	MIDDLESEX	1398468	23.2%	25275	3500	13610	14.28	0.027	695.07	1.337	63.19	0.122	0.284
10	NANTUCKET	6012	0.1%	109	15	59	0.06	0.000	2.99	0.006	0.27	0.001	0.001
11	NORFOLK	616087	10.2%	11135	1542	5996	6.29	0.012	306.21	0.589	27.84	0.054	0.125
12	PLYMOUTH	435276	7.2%	7867	1089	4236	4.44	0.009	216.34	0.416	19.67	0.038	0.088
13	SUFFOLK	663906	11.0%	11999	1661	6461	6.78	0.013	329.98	0.635	30.00	0.058	0.135
14	WORCESTER	709705	11.8%	12827	1776	6907	7.25	0.014	352.74	0.678	32.07	0.062	0.144
	STATE	6016425	100.0%	108738	15056	58551	61.44	0.118	2990.30	5.751	271.85	0.523	1.220

ACTIVITY LEVEL UNITS : TH.GALLONS BURNED

ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~52 PO THRUPUT : 14 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~52 PC THRUPUT : 35 ~~54~~ %

EMISSION FACTORS : VOC: 1.13
NOX: 55.0
CO: 5.0
EMISSION FACTOR UNITS : LB/TH.GAL AP-42 TABLE 1.3-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: 83 ~~86%~~ SAT : 17 ~~14%~~ SUN : 0%

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TH.GLS	ANNUAL CO TPY EF 5 LB	PEAK CO ACTIV TH.GALS	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	10379	25.95	5589	0.116
CAMBRIDGE	MIDX21	95802	1398468	6.9%	1731	4.33	932	0.019
QUINCY	NORF23	84985	616087	13.8%	1536	3.84	827	0.017
MEDFORD	MIDX21	57407	1398468	4.1%	1038	2.59	559	0.012
REVERE	SUFF25	42786	663906	6.4%	773	1.93	416	0.009
MALDEN	MIDX21	53884	1398468	3.9%	974	2.43	524	0.011
CHELSEA	SUFF25	28710	663906	4.3%	519	1.30	279	0.006
EVERETT	MIDX21	35701	1398468	2.6%	645	1.61	347	0.007
SOMERVILLE	MIDX21	76210	1398468	5.4%	1377	3.44	742	0.015
				TOTAL MET.BOSTON		47.43	10216	0.213
WORCESTER	WORC26	169759	709705	23.9%	3068	7.67	1652	0.034
SPRINGFIELD	HAMD19	156983	456310	34.4%	2837	7.09	1528	0.032
LOWELL	MIDX21	103439	1398468	7.4%	1870	4.67	1007	0.021
WALTHAM	MIDX21	57878	1398468	4.1%	1046	2.62	563	0.012

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT OCT-FEB (TABLE C.4 MOBILE SECTION)

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                    TABLE B.4-13   COMMERCIAL NATURAL GAS EMISSIONS 1990
comNGAS
   SCC :        21-03-006-000
               STATIONARY SOURCE FUEL COMBUSTION
               COMMERCIAL      NATURAL GAS

   STATE ACTIVITY LEVEL :      37,022    M.CU FT   (51,000 MCUFT - SSEIS 13,978 MCUFT)

   COUNTY ACTIVITY LEVEL :          ANNUAL    OZ PO    CO PC      VOC TPY  VOC PO      NOX TPY  NOX PO       CO TPY  CO PO   CO PC
   ---------------------          ACTIVITY    ACTIV  ACTIVITY      EM.FAC    TPSD       EM.FAC    TPSD       EM.FAC   TPSD    TPWD
   COUNTIES   POP 1990     %        M.CU FT  /312*.6  /312*1.4 5.3LB/MCUFT     /72 100 LB/MCUFT     /72  20 LB/MCUFT    /72    /120
   ========  =========  ====       =======  =======  =======    ========  ======     ========  ======     ======== =====  ======
 1 BARNSTABLE  186605   3.1%          1148      159      618        3.04   0.006        57.41   0.110        11.48  0.022   0.052
 2 BERKSHIRE   139352   2.3%           858      119      462        2.27   0.004        42.88   0.082         8.58  0.016   0.038
 3 BRISTOL     506325   8.4%          3116      431     1678        8.26   0.016       155.78   0.300        31.16  0.060   0.140
 4 DUKES        11639   0.2%            72       10       39        0.19   0.000         3.58   0.007         0.72  0.001   0.003
 5 ESSEX       670080  11.1%          4123      571     2220       10.93   0.021       206.17   0.396        41.23  0.079   0.185
 6 FRANKLIN     70092   1.2%           431       60      232        1.14   0.002        21.57   0.041         4.31  0.008   0.019
 7 HAMPDEN     456310   7.6%          2808      389     1512        7.44   0.014       140.39   0.270        28.08  0.054   0.126
 8 HAMPSHIRE   146568   2.4%           902      125      486        2.39   0.005        45.10   0.087         9.02  0.017   0.040
 9 MIDDLESEX  1398468  23.2%          8605     1192     4634       22.80   0.044       430.27   0.827        86.05  0.165   0.386
10 NANTUCKET     6012   0.1%            37        5       20        0.10   0.000         1.85   0.004         0.37  0.001   0.002
11 NORFOLK     616087  10.2%          3791      525     2041       10.05   0.019       189.55   0.365        37.91  0.073   0.170
12 PLYMOUTH    435276   7.2%          2678      371     1442        7.10   0.014       133.92   0.258        26.78  0.052   0.120
13 SUFFOLK     663906  11.0%          4085      566     2200       10.83   0.021       204.27   0.393        40.85  0.079   0.183
14 WORCESTER   709705  11.8%          4367      605     2352       11.57   0.022       218.36   0.420        43.67  0.084   0.196

   STATE      6016425 100.0%         37022     5126    19935       98.11   0.189      1851.10   3.560       370.22  0.712   1.661

ACTIVITY LEVEL UNITS :          M. CU FT                                                                 ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :        BURNED                       NON-ATT   COUNTY       TOWN  COUNTY    %TOWN  ACTIV CO TPY   ACTIV    TPWD
ACTIVITY LEVEL METHOD :                                        TOWNS                POPUL   POPUL    /CNTY M CUFT EF 20LB  M CUFT   /151
                                                             =======   ======    ======== =======   ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :             6                             BOSTON   SUFF25      574283  663906    86.5%   3534   35.34    1903  0.159
PEAK OZ WEEKS/YEAR :            ~~12~~52    PO THRUPUT : 14 %   CAMBRIDGE   MIDX21       95802 1398468     6.9%    590    5.90     317  0.026
                                                              QUINCY   NORF23       84985  616087    13.8%    523    5.23     282  0.023
PEAK CO DAYS/WEEK :             6                      35    MEDFORD   MIDX21       57407 1398468     4.1%    353    3.53     190  0.016
PEAK CO WEEKS/YEAR :            ~~20~~52    PC THRUPUT : ~~54~~ %     REVERE   SUFF25       42786  663906     6.4%    263    2.63     142  0.012
                                                              MALDEN   MIDX21       53884 1398468     3.9%    332    3.32     179  0.015
EMISSION FACTORS :       VOC:   5.3                          CHELSEA   SUFF25       28710  663906     4.3%    177    1.77      95  0.008
                         NOX:   100.0                        EVERETT   MIDX21       35701 1398468     2.6%    220    2.20     118  0.010
                         CO:    20.0                      SOMERVILLE   MIDX21       76210 1398468     5.4%    469    4.69     253  0.021
EMISSION FACTOR UNITS :         LB/M CU FT  AP-42 TABLE 1.4-1                                  TOTAL MET.BOSTON      64.60    3478  0.290
                                                           WORCESTER   WORC26      169759  709705    23.9%   1045   10.45     562  0.047
RULE EFFECTIVENESS :            N/A                      SPRINGFIELD   HAMD19      156983  456310    34.4%    966    9.66     520  0.043
RULE PENETRATION :              N/A                           LOWELL   MIDX21      103439 1398468     7.4%    637    6.37     343  0.029
SIP RULE :                      NO                           WALTHAM   MIDX21       57878 1398468     4.1%    356    3.56     192  0.016

PO INTERVAL :                   1 HR
PC INTERVAL :                   8 HR
                 83             17
WEEKDAY:         ~~86~~ %     SAT : ~~14~~%         SUN :     0%
                                                                    DEC
COMMENTS:     SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~-FEB (TABLE C.4 MOBILE SECTION)
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TABLE B.4-14 COMMERCIAL KEROSENE EMISSIONS 1990

comkeros
'' SCC : 21-03-011-000
STATIONARY SOURCE FUEL COMBUSTION
COMMERCIAL KEROSENE

STATE ACTIVITY LEVEL : 5,334 TH.GALLS (127 T.BARRLS * 42)

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV /312*.6	CO PC ACTIVITY /312*1.4	VOC TPY EM.FAC 32.1 LB/TGL	VOC PO TPSD /72	NOX TPY EM.FAC 469LB/T.GL	NOX PO TPSD /72	CO TPY EM.FAC 102LB/T.GL	CO PO TPSD /72	CO PC TPWD /120
1	BARNSTABLE	186605	3.1%	165	22.9	112	2.66	0.005	38.80	0.075	8.44	0.016	0.048
2	BERKSHIRE	139352	2.3%	124	17.1	84	1.98	0.004	28.97	0.056	6.30	0.012	0.036
3	BRISTOL	506325	8.4%	449	62.2	304	7.20	0.014	105.27	0.202	22.89	0.044	0.129
4	DUKES	11639	0.2%	10	1.4	7	0.17	0.000	2.42	0.005	0.53	0.001	0.003
5	ESSEX	670080	11.1%	594	82.3	403	9.53	0.018	139.31	0.268	30.30	0.058	0.171
6	FRANKLIN	70092	1.2%	62	8.6	42	1.00	0.002	14.57	0.028	3.17	0.006	0.018
7	HAMPDEN	456310	7.6%	405	56.0	274	6.49	0.012	94.87	0.182	20.63	0.040	0.116
8	HAMPSHIRE	146568	2.4%	130	18.0	88	2.09	0.004	30.47	0.059	6.63	0.013	0.037
9	MIDDLESEX	1398468	23.2%	1240	171.7	840	19.90	0.038	290.74	0.559	63.23	0.122	0.357
10	NANTUCKET	6012	0.1%	5	0.7	4	0.09	0.000	1.25	0.002	0.27	0.001	0.002
11	NORFOLK	616087	10.2%	546	75.6	370	8.77	0.017	128.09	0.246	27.86	0.054	0.157
12	PLYMOUTH	435276	7.2%	386	53.4	261	6.19	0.012	90.49	0.174	19.68	0.038	0.111
13	SUFFOLK	663906	11.0%	589	81.5	399	9.45	0.018	138.03	0.265	30.02	0.058	0.169
14	WORCESTER	709705	11.8%	629	87.1	426	10.10	0.019	147.55	0.284	32.09	0.062	0.181
	STATE	6016425	100.0%	5334	738.6	3614	85.61	0.165	1250.82	2.405	272.03	0.523	1.536

ACTIVITY LEVEL UNITS : TH.GALLS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~52 PO THRUPUT : 14 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~52 PC THRUPUT : ~~54~~ 35 %

EMISSION FACTORS : VOC: 32.1
NOX: 469.0
CO: 102.2
EMISSION FACTOR UNITS : LB/T.GALLS NAPAP P.35

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: ~~86%~~ 93 SAT : ~~14%~~ 17 SUN : 0%

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TONS	ANNUAL CO TPY EF102LB	PEAK CO ACTIV TONS	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	509	25.97	345	0.147
CAMBRIDGE	MIDX21	95802	1398468	6.9%	85	4.33	58	0.024
QUINCY	NORF23	84985	616087	13.8%	75	3.84	51	0.022
MEDFORD	MIDX21	57407	1398468	4.1%	51	2.60	34	0.015
REVERE	SUFF25	42786	663906	6.4%	38	1.93	26	0.011
MALDEN	MIDX21	53884	1398468	3.9%	48	2.44	32	0.014
CHELSEA	SUFF25	28710	663906	4.3%	25	1.30	17	0.007
EVERETT	MIDX21	35701	1398468	2.6%	32	1.61	21	0.009
SOMERVILLE	MIDX21	76210	1398468	5.4%	68	3.45	46	0.019
				TOTAL MET.BOSTON		47.47	631	0.268
WORCESTER	WORC26	169759	709705	23.9%	151	7.68	102	0.043
SPRINGFIELD	HAMD19	156983	456310	34.4%	139	7.10	94	0.040
LOWELL	MIDX21	103439	1398468	7.4%	92	4.68	62	0.026
WALTHAM	MIDX21	57878	1398468	4.1%	51	2.62	35	0.015

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

TABLE B.4-15 COMMERCIAL LIQUID PETROLEUM GAS EMISSIONS 1990

comLPG
SCC : 21-03-007-000
STATIONARY SOURCE FUEL COMBUSTION
COMMERCIAL LPG

STATE ACTIVITY LEVEL : 9,829 TH.GALLS (240 T.BARRELS * 42 = 10,080 T GALS - SSEIS POINT 251 T GALS)

COUNTY ACTIVITY LEVEL :

COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	OZ PO ACTIV /312*.6	CO PC ACTIVITY /312*1.4	VOC TPY EM.FAC .485 LB/TGL	VOC PO TPSD /72	NOX TPY EM.FAC 9.1LB/T.GL	NOX PO TPSD /72	CO TPY EM.FAC 1.85LB/T.GL	CO PO TPSD /72	CO PC TPWD /120
1 BARNSTABLE	186605	3.1%	305	42.2	164	0.07	0.000	1.39	0.003	0.28	0.001	0.001
2 BERKSHIRE	139352	2.3%	228	31.5	123	0.06	0.000	1.04	0.002	0.21	0.000	0.001
3 BRISTOL	506325	8.4%	827	114.5	445	0.20	0.000	3.76	0.007	0.77	0.001	0.003
4 DUKES	11639	0.2%	19	2.6	10	0.00	0.000	0.09	0.000	0.02	0.000	0.000
5 ESSEX	670080	11.1%	1095	151.6	589	0.27	0.001	4.98	0.010	1.01	0.002	0.005
6 FRANKLIN	70092	1.2%	115	15.9	62	0.03	0.000	0.52	0.001	0.11	0.000	0.000
7 HAMPDEN	456310	7.6%	745	103.2	401	0.18	0.000	3.39	0.007	0.69	0.001	0.003
8 HAMPSHIRE	146568	2.4%	239	33.2	129	0.06	0.000	1.09	0.002	0.22	0.000	0.001
9 MIDDLESEX	1398468	23.2%	2285	316.3	1230	0.55	0.001	10.40	0.020	2.11	0.004	0.009
10 NANTUCKET	6012	0.1%	10	1.4	5	0.00	0.000	0.04	0.000	0.01	0.000	0.000
11 NORFOLK	616087	10.2%	1006	139.4	542	0.24	0.000	4.58	0.009	0.93	0.002	0.004
12 PLYMOUTH	435276	7.2%	711	98.5	383	0.17	0.000	3.24	0.006	0.66	0.001	0.003
13 SUFFOLK	663906	11.0%	1085	150.2	584	0.26	0.001	4.94	0.009	1.00	0.002	0.005
14 WORCESTER	709705	11.8%	1159	160.5	624	0.28	0.001	5.28	0.010	1.07	0.002	0.005
STATE	6016425	100.0%	9829	1360.9	5293	2.38	0.005	44.72	0.086	9.09	0.017	0.041

ACTIVITY LEVEL UNITS : TH.GALLONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~52 PO THRUPUT : 14 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~52 PC THRUPUT : ~~54~~ 35 %

EMISSION FACTORS : VOC: 0.485
NOX: 9.10
CO: 1.85
EMISSION FACTOR UNITS : LB/T.GALLS AP42 T.1.5-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: ~~86%~~ 83 SAT : ~~14%~~ 17 SUN : 0 %

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT OCT-FEB DEC (TABLE C.4 MOBILE SECTION)

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TONS	ANNUAL CO TPY EF1.85LB	PEAK CO ACTIV TONS	PEAK CO TPWD /151
BOSTON	SUFF25	574283	663906	86.5%	938	0.87	505	0.004
CAMBRIDGE	MIDX21	95802	1398468	6.9%	157	0.14	84	0.001
QUINCY	NORF23	84985	616087	13.8%	139	0.13	75	0.001
MEDFORD	MIDX21	57407	1398468	4.1%	94	0.09	50	0.000
REVERE	SUFF25	42786	663906	6.4%	70	0.06	38	0.000
MALDEN	MIDX21	53884	1398468	3.9%	88	0.08	47	0.000
CHELSEA	SUFF25	28710	663906	4.3%	47	0.04	25	0.000
EVERETT	MIDX21	35701	1398468	2.6%	58	0.05	31	0.000
SOMERVILLE	MIDX21	76210	1398468	5.4%	125	0.12	67	0.001
				TOTAL MET.BOSTON		1.59	923	0.007
WORCESTER	WORC26	169759	709705	23.9%	277	0.26	149	0.001
SPRINGFIELD	HAMD19	156983	456310	34.4%	256	0.24	138	0.001
LOWELL	MIDX21	103439	1398468	7.4%	169	0.16	91	0.001
WALTHAM	MIDX21	57878	1398468	4.1%	95	0.09	51	0.000

TABLE B.4-16 INDUSTRIAL BITUMINOUS COAL EMISSIONS 1990

indBcoal
SCC : 21-02-002-000
STATIONARY SOURCE FUEL COMBUSTION
INDUSTRIAL BITUMINOUS COAL

STATE ACTIVITY LEVEL : 16,064 TONS (70,000 TONS - SSEIS POINT 53,936 TONS)

COUNTY ACTIVITY LEVEL :

COUNTIES	POP 1990	%	ANNUAL ACTIVITY TONS	uniform OZ PO ACTIV /312*72	uniform CO PC ACTIVITY /312*120	VOC TPY EM.FAC .070LB/TON	VOC PO LB PSD /72	NOX TPY EM.FAC 14LB/TON	NOX PO TPSD /72	CO TPY EM.FAC 5LB/TON	CO PO TPSD /72	CO PC TPWD /120
1 BARNSTABLE	186605	3.1%	498	115	192	0.02	0.11178	3.488	0.011	1.25	0.004	0.004
2 BERKSHIRE	139352	2.3%	372	86	143	0.01	0.00004	2.605	0.008	0.93	0.003	0.003
3 BRISTOL	506325	8.4%	1352	312	520	0.05	0.00015	9.463	0.030	3.38	0.011	0.011
4 DUKES	11639	0.2%	31	7	12	0.00	0.00000	0.218	0.001	0.08	0.000	0.000
5 ESSEX	670080	11.1%	1789	413	688	0.06	0.00020	12.524	0.040	4.47	0.014	0.014
6 FRANKLIN	70092	1.2%	187	43	72	0.01	0.00002	1.310	0.004	0.47	0.001	0.001
7 HAMPDEN	456310	7.6%	1218	281	469	0.04	0.00014	8.529	0.027	3.05	0.010	0.010
8 HAMPSHIRE	146568	2.4%	391	90	151	0.01	0.00004	2.739	0.009	0.98	0.003	0.003
9 MIDDLESEX	1398468	23.2%	3734	862	1436	0.13	0.00042	26.138	0.084	9.33	0.030	0.030
10 NANTUCKET	6012	0.1%	16	4	6	0.00	0.00000	0.112	0.000	0.04	0.000	0.000
11 NORFOLK	616087	10.2%	1645	380	633	0.06	0.00018	11.515	0.037	4.11	0.013	0.013
12 PLYMOUTH	435276	7.2%	1162	268	447	0.04	0.00013	8.135	0.026	2.91	0.009	0.009
13 SUFFOLK	663906	11.0%	1773	409	682	0.06	0.00020	12.409	0.040	4.43	0.014	0.014
14 WORCESTER	709705	11.8%	1895	437	729	0.07	0.00021	13.265	0.043	4.74	0.015	0.015
STATE	6016425	100.0%	16064	3707	6178	0.56	0.00180	112.448	0.360	40.16	0.129	0.129

ACTIVITY LEVEL UNITS : TONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~ 52 PO THRUPUT : ~~23~~ 25 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~38.5~~ 25 %

EMISSION FACTORS : VOC: 0.07
NOX: 14.0
CO: 5.0

EMISSION FACTOR UNITS : LB/TON AP-42 TABLE 1.1-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: ~~86%~~ 83 SAT : ~~14~~ 17 % SUN : 0 %

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TONS	ANNUAL CO TPY EF 5.0LB	PEAK CO ACTIV TONS	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	1533	3.83	590	0.012
CAMBRIDGE	MIDX21	95802	1398468	6.9%	256	0.64	98	0.002
QUINCY	NORF23	84985	616087	13.8%	227	0.57	87	0.002
MEDFORD	MIDX21	57407	1398468	4.1%	153	0.38	59	0.001
REVERE	SUFF25	42786	663906	6.4%	114	0.29	44	0.001
MALDEN	MIDX21	53884	1398468	3.9%	144	0.36	55	0.001
CHELSEA	SUFF25	28710	663906	4.3%	77	0.19	29	0.001
EVERETT	MIDX21	35701	1398468	2.6%	95	0.24	37	0.001
SOMERVILLE	MIDX21	76210	1398468	5.4%	203	0.51	78	0.002
				TOTAL MET.BOSTON		7.01	1078	0.022
WORCESTER	WORC26	169759	709705	23.9%	453	1.13	174	0.004
SPRINGFIELD	HAMD19	156983	456310	34.4%	419	1.05	161	0.003
LOWELL	MIDX21	103439	1398468	7.4%	276	0.69	106	0.002
WALTHAM	MIDX21	57878	1398468	4.1%	155	0.39	59	0.001

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

TABLE B.4-17 INDUSTRIAL ANTHRACITE COAL EMISSIONS 1990

indAcoal
SCC : 21-02-001-000
STATIONARY SOURCE FUEL COMBUSTION
INDUSTRIAL ANTHRACITE COAL

STATE ACTIVITY LEVEL : 3,000 TONS

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TONS	uniform OZ PO ACTIV /312*72	uniform CO PC ACTIVITY /312*120	VOC TPY EM.FAC 0.070LB/TON	VOC PO TPSD /72	NOX TPY EM.FAC 18LB/TON	NOX PO TPSD /72	CO TPY EM.FAC 5LB/TON	CO PO TPSD /72	CO PC TPWD /120
1	BARNSTABLE	186605	3.1%	93	21	36	0.00	0.000	0.837	0.003	0.23	0.001	0.001
2	BERKSHIRE	139352	2.3%	69	16	27	0.00	0.000	0.625	0.002	0.17	0.001	0.001
3	BRISTOL	506325	8.4%	252	58	97	0.01	0.000	2.272	0.007	0.63	0.002	0.002
4	DUKES	11639	0.2%	6	1	2	0.00	0.000	0.052	0.000	0.01	0.000	0.000
5	ESSEX	670080	11.1%	334	77	129	0.01	0.000	3.007	0.010	0.84	0.003	0.003
6	FRANKLIN	70092	1.2%	35	8	13	0.00	0.000	0.315	0.001	0.09	0.000	0.000
7	HAMPDEN	456310	7.6%	228	53	88	0.01	0.000	2.048	0.007	0.57	0.002	0.002
8	HAMPSHIRE	146568	2.4%	73	17	28	0.00	0.000	0.658	0.002	0.18	0.001	0.001
9	MIDDLESEX	1398468	23.2%	697	161	268	0.02	0.000	6.276	0.020	1.74	0.006	0.006
10	NANTUCKET	6012	0.1%	3	1	1	0.00	0.000	0.027	0.000	0.01	0.000	0.000
11	NORFOLK	616087	10.2%	307	71	118	0.01	0.000	2.765	0.009	0.77	0.002	0.002
12	PLYMOUTH	435276	7.2%	217	50	83	0.01	0.000	1.953	0.006	0.54	0.002	0.002
13	SUFFOLK	663906	11.0%	331	76	127	0.01	0.000	2.979	0.010	0.83	0.003	0.003
14	WORCESTER	709705	11.8%	354	82	136	0.01	0.000	3.185	0.010	0.88	0.003	0.003
	STATE	6016425	100.0%	3000	692	1154	0.11	0.000	27.000	0.087	7.50	0.024	0.024

ACTIVITY LEVEL UNITS : TONS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~ 52 PO THRUPUT : ~~23~~ 25 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~30.5~~ 25 %

EMISSION FACTORS : VOC: 0.07
NOX: 18.0
CO: 5.0
EMISSION FACTOR UNITS : LB/TON AP-42 TABLE 1.2-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: ~~86%~~ 83 SAT : ~~14~~ 17 % SUN : 0 %

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TONS	ANNUAL CO TPY EF 5.0LB	PEAK CO ACTIV TONS	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	286	0.72	110	0.002
CAMBRIDGE	MIDX21	95802	1398468	6.9%	48	0.12	18	0.000
QUINCY	NORF23	84985	616087	13.8%	42	0.11	16	0.000
MEDFORD	MIDX21	57407	1398468	4.1%	29	0.07	11	0.000
REVERE	SUFF25	42786	663906	6.4%	21	0.05	8	0.000
MALDEN	MIDX21	53884	1398468	3.9%	27	0.07	10	0.000
CHELSEA	SUFF25	28710	663906	4.3%	14	0.04	6	0.000
EVERETT	MIDX21	35701	1398468	2.6%	18	0.04	7	0.000
SOMERVILLE	MIDX21	76210	1398468	5.4%	38	0.10	15	0.000
				TOTAL MET.BOSTON		1.31	201	0.004
WORCESTER	WORC26	169759	709705	23.9%	85	0.21	33	0.001
SPRINGFIELD	HAMD19	156983	456310	34.4%	78	0.20	30	0.001
LOWELL	MIDX21	103439	1398468	7.4%	52	0.13	20	0.000
WALTHAM	MIDX21	57878	1398468	4.1%	29	0.07	11	0.000

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                 TABLE B.4-18    INDUSTRIAL DISTILLATE OIL EMISSIONS 1990
indDoil
    SCC :      21-02-004-000
               STATIONARY SOURCE FUEL COMBUSTION
               INDUSTRIAL      DISTILLATE OIL

   STATE ACTIVITY LEVEL :       42,044    TH.GALLS  (2,176 TH.BARRELS * 42 GALS = 91,382 T.GLS - SSEIS 49,338 T.GLS)
                                           uniform   uniform
   COUNTY ACTIVITY LEVEL :          ANNUAL    OZ PO     CO PC    VOC TPY  VOC PO    NOX TPY  NOX PO    CO TPY  CO PO   CO PC
   ---------------------          ACTIVITY    ACTIV  ACTIVITY     EM.FAC    TPSD     EM.FAC    TPSD    EM.FAC   TPSD    TPWD
   COUNTIES    POP 1990     %     TH.GALLS  /312*72  /312*120  0.2LB/TGL     /72  20LB/TGL      /72   5LB/TGL    /72    /120
   ========  ========  ====     =======   =======   =======   ========  ======   ========  ======   ======== =====  ======
 1 BARNSTABLE  186605   3.1%        1304       301       502       0.13   0.000     13.040   0.042       3.26 0.010   0.010
 2 BERKSHIRE   139352   2.3%         974       225       375       0.10   0.000      9.738   0.031       2.43 0.008   0.008
 3 BRISTOL     506325   8.4%        3538       817      1361       0.35   0.001     35.383   0.113       8.85 0.028   0.028
 4 DUKES        11639   0.2%          81        19        31       0.01   0.000      0.813   0.003       0.20 0.001   0.001
 5 ESSEX       670080  11.1%        4683      1081      1801       0.47   0.002     46.827   0.150      11.71 0.038   0.038
 6 FRANKLIN     70092   1.2%         490       113       188       0.05   0.000      4.898   0.016       1.22 0.004   0.004
 7 HAMPDEN     456310   7.6%        3189       736      1226       0.32   0.001     31.888   0.102       7.97 0.026   0.026
 8 HAMPSHIRE   146568   2.4%        1024       236       394       0.10   0.000     10.242   0.033       2.56 0.008   0.008
 9 MIDDLESEX  1398468  23.2%        9773      2255      3759       0.98   0.003     97.728   0.313      24.43 0.078   0.078
10 NANTUCKET     6012   0.1%          42        10        16       0.00   0.000      0.420   0.001       0.11 0.000   0.000
11 NORFOLK     616087  10.2%        4305       994      1656       0.43   0.001     43.053   0.138      10.76 0.034   0.034
12 PLYMOUTH    435276   7.2%        3042       702      1170       0.30   0.001     30.418   0.097       7.60 0.024   0.024
13 SUFFOLK     663906  11.0%        4640      1071      1784       0.46   0.001     46.395   0.149      11.60 0.037   0.037
14 WORCESTER   709705  11.8%        4960      1145      1908       0.50   0.002     49.596   0.159      12.40 0.040   0.040
                                       0
   STATE      6016425 100.0%       42044      9702     16171       4.20   0.013    420.440   1.348     105.11 0.337   0.337

ACTIVITY LEVEL UNITS :        TH.GALLONS                                                        ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                    NON-ATT   COUNTY     TOWN  COUNTY   %TOWN  ACTIV CO TPY   ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                   TOWNS              POPUL   POPUL   /CNTY TH.GAL EF 5.0LB TH.GAL  /120
                                                        =======  ======  ======== =======   ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :            6                   25    BOSTON  SUFF25    574283  663906    86.5%   4013   10.03    1544  0.032
PEAK OZ WEEKS/YEAR :           ~~12~~52   PO THRUPUT : ~~23~~ %  CAMBRIDGE  MIDX21     95802 1398468     6.9%    669    1.67     257  0.005
                                                         QUINCY  NORF23     84985  616087    13.8%    594    1.48     228  0.005
PEAK CO DAYS/WEEK :            6                   25   MEDFORD  MIDX21     57407 1398468     4.1%    401    1.00     154  0.003
PEAK CO WEEKS/YEAR :           ~~20~~52   PC THRUPUT : ~~38.5~~ %  REVERE  SUFF25     42786  663906     6.4%    299    0.75     115  0.002
                                                         MALDEN  MIDX21     53884 1398468     3.9%    377    0.94     145  0.003
EMISSION FACTORS :      VOC:   0.20                     CHELSEA  SUFF25     28710  663906     4.3%    201    0.50      77  0.002
                        NOX:   20.0                     EVERETT  MIDX21     35701 1398468     2.6%    249    0.62      96  0.002
                        CO:    5.0                   SOMERVILLE  MIDX21     76210 1398468     5.4%    533    1.33     205  0.004
EMISSION FACTOR UNITS :       LB/TGL      AP-42 TABLE 1.3-1                          TOTAL MET.BOSTON       18.34    2822  0.059
                                                      WORCESTER  WORC26    169759  709705    23.9%   1186    2.97     456  0.010
RULE EFFECTIVENESS :           N/A                  SPRINGFIELD  HAMD19    156983  456310    34.4%   1097    2.74     422  0.009
RULE PENETRATION :             N/A                       LOWELL  MIDX21    103439 1398468     7.4%    723    1.81     278  0.006
SIP RULE :                     NO                       WALTHAM  MIDX21     57878 1398468     4.1%    404    1.01     156  0.003

PO INTERVAL :                  1 HR
PC INTERVAL :                  8 HR
                   83                17
WEEKDAY:           86%        SAT : ~~14~~ %      SUN :      0 %
                                                                           DEC
COMMENTS:     SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT OCT-FEB (TABLE C.4 MOBILE SECTION)
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                     TABLE B.4-19    INDUSTRIAL RESIDUAL OIL EMISSIONS 1990
indRoil
   SCC :      21-02-00~~4~~5-000
              STATIONARY SOURCE FUEL COMBUSTION
              INDUSTRIAL       RESIDUAL OIL

   STATE ACTIVITY LEVEL :         0        TH.GALLS  (2,623 BARRELS * 42 GALS = 110,166 T.GLS - SSEIS 149,226 T.GLS)
                                           uniform   uniform
   COUNTY ACTIVITY LEVEL :       ANNUAL     OZ PO     CO PC      VOC TPY  VOC PO     NOX TPY  NOX PO     CO TPY  CO PO   CO PC
   ----------------------      ACTIVITY     ACTIV  ACTIVITY      EM.FAC    TPSD      EM.FAC    TPSD     EM.FAC   TPSD    TPWD
   COUNTIES   POP 1990    %    TH.GALLS   /312*72  /312*120  0.28LB/TGL     /72    55LB/TGL     /72    5LB/TGL    /72    /120
   ========  =========  ====    =======   =======   =======    ========  ======    ========  ======   ======== =====  ======
  1 BARNSTABLE  186605   3.1%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
  2 BERKSHIRE   139352   2.3%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
  3 BRISTOL     506325   8.4%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
  4 DUKES        11639   0.2%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
  5 ESSEX       670080  11.1%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
  6 FRANKLIN     70092   1.2%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
  7 HAMPDEN     456310   7.6%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
  8 HAMPSHIRE   146568   2.4%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
  9 MIDDLESEX  1398468  23.2%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
 10 NANTUCKET     6012   0.1%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
 11 NORFOLK     616087  10.2%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
 12 PLYMOUTH    435276   7.2%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
 13 SUFFOLK     663906  11.0%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
 14 WORCESTER   709705  11.8%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000
                                      0
    STATE      6016425 100.0%         0         0         0        0.00   0.000       0.000   0.000       0.00 0.000   0.000

ACTIVITY LEVEL UNITS :        TH.GALLONS                                                                  ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                        NON-ATT   COUNTY       TOWN  COUNTY     %TOWN  ACTIV CO TPY    ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                       TOWNS                POPUL   POPUL     /CNTY TH.GAL EF 5.0LB TH.GAL  /120
                                                            =======   ======   ======== =======    ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :            6                   25        BOSTON   SUFF25     574283  663906     86.5%      0    0.00       0  0.000
PEAK OZ WEEKS/YEAR :          ~~12~~52   PO THRUPUT : ~~23~~ %   CAMBRIDGE   MIDX21      95802 1398468      6.9%      0    0.00       0  0.000
                                                             QUINCY   NORF23      84985  616087     13.8%      0    0.00       0  0.000
PEAK CO DAYS/WEEK :            6                   25       MEDFORD   MIDX21      57407 1398468      4.1%      0    0.00       0  0.000
PEAK CO WEEKS/YEAR :          ~~20~~ 52  PC THRUPUT : ~~38.5~~ %     REVERE   SUFF25      42786  663906      6.4%      0    0.00       0  0.000
                                                             MALDEN   MIDX21      53884 1398468      3.9%      0    0.00       0  0.000
EMISSION FACTORS :       VOC:  0.28                         CHELSEA   SUFF25      28710  663906      4.3%      0    0.00       0  0.000
                         NOX:  55.0                         EVERETT   MIDX21      35701 1398468      2.6%      0    0.00       0  0.000
                         CO:   5.0                       SOMERVILLE   MIDX21      76210 1398468      5.4%      0    0.00       0  0.000
EMISSION FACTOR UNITS :       LB/TGL    AP-42 TABLE 1.3-1                               TOTAL MET.BOSTON         0.00       0  0.000
                                                          WORCESTER   WORC26     169759  709705     23.9%      0    0.00       0  0.000
RULE EFFECTIVENESS :           N/A                      SPRINGFIELD   HAMD19     156983  456310     34.4%      0    0.00       0  0.000
RULE PENETRATION :             N/A                           LOWELL   MIDX21     103439 1398468      7.4%      0    0.00       0  0.000
SIP RULE :                     NO                           WALTHAM   MIDX21      57878 1398468      4.1%      0    0.00       0  0.000

PO INTERVAL :                  1 HR
PC INTERVAL :                  8 HR
                   83           17
WEEKDAY:          ~~86%~~      SAT : ~~14~~ %     SUN :      0 %
                                                                   DEC
COMMENTS:      SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~-FEB (TABLE C.4 MOBILE SECTION)
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TABLE B.4-20 INDUSTRIAL NATURAL GAS EMISSIONS 1990

indNgas
SCC : 21-02-006-000
STATIONARY SOURCE FUEL COMBUSTION
INDUSTRIAL NATURAL GAS

STATE ACTIVITY LEVEL : 24,989 M.CU FT (44,000 MCUFT - SSEIS 19,011 MCUFT)

COUNTY ACTIVITY LEVEL :

COUNTIES	POP 1990	%	ANNUAL ACTIVITY M.CU FT	uniform OZ PO ACTIV /312*72	uniform CO PC ACTIVITY /312*120	VOC TPY EM.FAC 2.8LB/MCUFT	VOC PO TPSD /72	NOX TPY EM.FAC 140LB/MCUFT	NOX PO TPSD /72	CO TPY EM.FAC 35LB/MCUFT	CO PO TPSD /72	CO PC TPWD /120
1 BARNSTABLE	186605	3.1%	775	179	298	1.09	0.003	54.254	0.174	13.56	0.043	0.043
2 BERKSHIRE	139352	2.3%	579	134	223	0.81	0.003	40.516	0.130	10.13	0.032	0.032
3 BRISTOL	506325	8.4%	2103	485	809	2.94	0.009	147.210	0.472	36.80	0.118	0.118
4 DUKES	11639	0.2%	48	11	19	0.07	0.000	3.384	0.011	0.85	0.003	0.003
5 ESSEX	670080	11.1%	2783	642	1070	3.90	0.012	194.821	0.624	48.71	0.156	0.156
6 FRANKLIN	70092	1.2%	291	67	112	0.41	0.001	20.379	0.065	5.09	0.016	0.016
7 HAMPDEN	456310	7.6%	1895	437	729	2.65	0.009	132.669	0.425	33.17	0.106	0.106
8 HAMPSHIRE	146568	2.4%	609	140	234	0.85	0.003	42.614	0.137	10.65	0.034	0.034
9 MIDDLESEX	1398468	23.2%	5808	1340	2234	8.13	0.026	406.594	1.303	101.65	0.326	0.326
10 NANTUCKET	6012	0.1%	25	6	10	0.03	0.000	1.748	0.006	0.44	0.001	0.001
11 NORFOLK	616087	10.2%	2559	591	984	3.58	0.011	179.123	0.574	44.78	0.144	0.144
12 PLYMOUTH	435276	7.2%	1808	417	695	2.53	0.008	126.553	0.406	31.64	0.101	0.101
13 SUFFOLK	663906	11.0%	2758	636	1061	3.86	0.012	193.026	0.619	48.26	0.155	0.155
14 WORCESTER	709705	11.8%	2948	680	1134	4.13	0.013	206.341	0.661	51.59	0.165	0.165
STATE	6016425	100.0%	24989	5767	9611	34.98	0.112	1749.230	5.607	437.31	1.402	1.402

ACTIVITY LEVEL UNITS : M.CU FT
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~ 52 PO THRUPUT : ~~23~~ 25 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~38.5~~ 25 %

EMISSION FACTORS : VOC: 2.8
NOX: 140.0
CO: 35.0
EMISSION FACTOR UNITS : LB/MCUFT AP-42 TABLE 1.4-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: ~~86%~~ 93 SAT : ~~14~~ 17 % SUN : 0 %

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV MCUFT	ANNUAL CO TPY EF 35LB	PEAK CO ACTIV MCUFT	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	2385	41.74	917	0.134
CAMBRIDGE	MIDX21	95802	1398468	6.9%	398	6.96	153	0.022
QUINCY	NORF23	84985	616087	13.8%	353	6.18	136	0.020
MEDFORD	MIDX21	57407	1398468	4.1%	238	4.17	92	0.013
REVERE	SUFF25	42786	663906	6.4%	178	3.11	68	0.010
MALDEN	MIDX21	53884	1398468	3.9%	224	3.92	86	0.013
CHELSEA	SUFF25	28710	663906	4.3%	119	2.09	46	0.007
EVERETT	MIDX21	35701	1398468	2.6%	148	2.59	57	0.008
SOMERVILLE	MIDX21	76210	1398468	5.4%	317	5.54	122	0.018
TOTAL MET.BOSTON						76.30	1677	0.245
WORCESTER	WORC26	169759	709705	23.9%	705	12.34	271	0.040
SPRINGFIELD	HAMD19	156983	456310	34.4%	652	11.41	251	0.037
LOWELL	MIDX21	103439	1398468	7.4%	430	7.52	165	0.024
WALTHAM	MIDX21	57878	1398468	4.1%	240	4.21	92	0.013

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

TABLE B.4-21 INDUSTRIAL KEROSENE EMISSIONS 1990

indkeros
SCC : 21-02-011-000 (NO AMS SCC CODE FOR INDUSTRIAL KEROSENE)
STATIONARY SOURCE FUEL COMBUSTION
INDUSTRIAL KEROSENE

STATE ACTIVITY LEVEL : 756 TH GALLS (18,000 BARRELS * 42 GALS)

COUNTY ACTIVITY LEVEL : COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	uniform OZ PO ACTIV /312*72	uniform CO PC ACTIVITY /312*120	VOC TPY EM.FAC 32LB/T.GAL	VOC PO TPSD /72	NOX TPY EM.FAC 469LB/T.GAL	NOX PO TPSD /72	CO TPY EM.FAC 102LB/T.GAL	CO PO TPSD /72	CO PC TPWD /120
1 BARNSTABLE	186605	3.1%	23	5	9	0.38	0.001	5.499	0.018	1.20	0.004	0.004
2 BERKSHIRE	139352	2.3%	18	4	7	0.28	0.001	4.106	0.013	0.89	0.003	0.003
3 BRISTOL	506325	8.4%	64	15	24	1.02	0.003	14.920	0.048	3.24	0.010	0.010
4 DUKES	11639	0.2%	1	0	1	0.02	0.000	0.343	0.001	0.07	0.000	0.000
5 ESSEX	670080	11.1%	84	19	32	1.35	0.004	19.745	0.063	4.29	0.014	0.014
6 FRANKLIN	70092	1.2%	9	2	3	0.14	0.000	2.065	0.007	0.45	0.001	0.001
7 HAMPDEN	456310	7.6%	57	13	22	0.92	0.003	13.446	0.043	2.92	0.009	0.009
8 HAMPSHIRE	146568	2.4%	18	4	7	0.29	0.001	4.319	0.014	0.94	0.003	0.003
9 MIDDLESEX	1398468	23.2%	176	41	68	2.81	0.009	41.208	0.132	8.96	0.029	0.029
10 NANTUCKET	6012	0.1%	1	0	0	0.01	0.000	0.177	0.001	0.04	0.000	0.000
11 NORFOLK	616087	10.2%	77	18	30	1.24	0.004	18.154	0.058	3.95	0.013	0.013
12 PLYMOUTH	435276	7.2%	55	13	21	0.88	0.003	12.826	0.041	2.79	0.009	0.009
13 SUFFOLK	663906	11.0%	83	19	32	1.33	0.004	19.563	0.063	4.25	0.014	0.014
14 WORCESTER	709705	11.8%	89	21	34	1.43	0.005	20.912	0.067	4.55	0.015	0.015
STATE	6016425	100.0%	756	174	291	12.10	0.039	177.282	0.568	38.56	0.124	0.124

ACTIVITY LEVEL UNITS : TH.GALLS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~ 52 PO THRUPUT : ~~23~~ 25 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~38.5~~ 25 %

EMISSION FACTORS : VOC: 32.0
NOX: 469.0
CO: 102.0
EMISSION FACTOR UNITS : LB/TH.GAL NAPAP P.35

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: ~~86%~~ 83 SAT : ~~14~~ 17 % SUN : 0 %

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TH.GAL	ANNUAL CO TPY EF 102LB	PEAK CO ACTIV TH.GAL	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	72	3.68	28	0.012
CAMBRIDGE	MIDX21	95802	1398468	6.9%	12	0.61	5	0.002
QUINCY	NORF23	84985	616087	13.8%	11	0.54	4	0.002
MEDFORD	MIDX21	57407	1398468	4.1%	7	0.37	3	0.001
REVERE	SUFF25	42786	663906	6.4%	5	0.27	2	0.001
MALDEN	MIDX21	53884	1398468	3.9%	7	0.35	3	0.001
CHELSEA	SUFF25	28710	663906	4.3%	4	0.18	1	0.001
EVERETT	MIDX21	35701	1398468	2.6%	4	0.23	2	0.001
SOMERVILLE	MIDX21	76210	1398468	5.4%	10	0.49	4	0.002
				TOTAL MET.BOSTON		6.73	51	0.022
WORCESTER	WORC26	169759	709705	23.9%	21	1.09	8	0.003
SPRINGFIELD	HAMD19	156983	456310	34.4%	20	1.01	8	0.003
LOWELL	MIDX21	103439	1398468	7.4%	13	0.66	5	0.002
WALTHAM	MIDX21	57878	1398468	4.1%	7	0.37	3	0.001

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)
NO AMS SCC CODE FOR INDUSTRIAL KEROSENE - WILL USE THAT OF COMMERCIAL

TABLE B.4-22 INDUSTRIAL LIQUID PETROLEUM GAS EMISSIONS 1990

indLPG
SCC : 21-02-007-000
STATIONARY SOURCE FUEL COMBUSTION
INDUSTRIAL L P G

STATE ACTIVITY LEVEL : 40,202 TH GALLS (974 TH.BARRELS * 42 GALS = 40,908 T.GALS -SSEIS POINT 706 T.GALS)

COUNTY ACTIVITY LEVEL :

	COUNTIES	POP 1990	%	ANNUAL ACTIVITY TH.GALLS	uniform OZ PO ACTIV /312*72	uniform CO PC ACTIVITY /312*120	VOC TPY EM.FAC .255LB/T.GAL	VOC PO TPSD /72	NOX TPY EM.FAC 12.8LB/T.GAL	NOX PO TPSD /72	CO TPY EM.FAC 3.2LB/T.GAL	CO PO TPSD /72	CO PC TPWD /120
1	BARNSTABLE	186605	3.1%	1247	288	480	0.16	0.001	7.980	0.026	2.00	0.006	0.006
2	BERKSHIRE	139352	2.3%	931	215	358	0.12	0.000	5.959	0.019	1.49	0.005	0.005
3	BRISTOL	506325	8.4%	3383	781	1301	0.43	0.001	21.653	0.069	5.41	0.017	0.017
4	DUKES	11639	0.2%	78	18	30	0.01	0.000	0.498	0.002	0.12	0.000	0.000
5	ESSEX	670080	11.1%	4478	1033	1722	0.57	0.002	28.656	0.092	7.16	0.023	0.023
6	FRANKLIN	70092	1.2%	468	108	180	0.06	0.000	2.997	0.010	0.75	0.002	0.002
7	HAMPDEN	456310	7.6%	3049	704	1173	0.39	0.001	19.514	0.063	4.88	0.016	0.016
8	HAMPSHIRE	146568	2.4%	979	226	377	0.12	0.000	6.268	0.020	1.57	0.005	0.005
9	MIDDLESEX	1398468	23.2%	9345	2156	3594	1.19	0.004	59.806	0.192	14.95	0.048	0.048
10	NANTUCKET	6012	0.1%	40	9	15	0.01	0.000	0.257	0.001	0.06	0.000	0.000
11	NORFOLK	616087	10.2%	4117	950	1583	0.52	0.002	26.347	0.084	6.59	0.021	0.021
12	PLYMOUTH	435276	7.2%	2909	671	1119	0.37	0.001	18.615	0.060	4.65	0.015	0.015
13	SUFFOLK	663906	11.0%	4436	1024	1706	0.57	0.002	28.392	0.091	7.10	0.023	0.023
14	WORCESTER	709705	11.8%	4742	1094	1824	0.60	0.002	30.351	0.097	7.59	0.024	0.024
							0.00	0.000	0.000	0.000	0.00	0.000	0.000
	STATE	6016425	100.0%	40202	9277	15462	5.13	0.016	257.293	0.825	64.32	0.206	0.206

ACTIVITY LEVEL UNITS : TH.GALLS
ACTIVITY LEVEL PROCESS : BURNED
ACTIVITY LEVEL METHOD :

PEAK OZ DAYS/WEEK : 6
PEAK OZ WEEKS/YEAR : ~~12~~ 52 PO THRUPUT : ~~23~~ 25 %

PEAK CO DAYS/WEEK : 6
PEAK CO WEEKS/YEAR : ~~20~~ 52 PC THRUPUT : ~~38.5~~ 25 %

EMISSION FACTORS : VOC: 0.255
NOX: 12.8
CO: 3.2
EMISSION FACTOR UNITS : LB/TH.GAL AP42 T.1.5-1

RULE EFFECTIVENESS : N/A
RULE PENETRATION : N/A
SIP RULE : NO

PO INTERVAL : 1 HR
PC INTERVAL : 8 HR

WEEKDAY: 86% SAT : 14 % SUN : 0 %

NON-ATT TOWNS	COUNTY	TOWN POPUL	COUNTY POPUL	%TOWN /CNTY	ANNUAL ACTIV TH.GAL	ANNUAL CO TPY EF 3.2LB	PEAK CO ACTIV TH.GAL	PEAK CO TPWD /120
BOSTON	SUFF25	574283	663906	86.5%	3837	6.14	1476	0.020
CAMBRIDGE	MIDX21	95802	1398468	6.9%	640	1.02	246	0.003
QUINCY	NORF23	84985	616087	13.8%	568	0.91	218	0.003
MEDFORD	MIDX21	57407	1398468	4.1%	384	0.61	148	0.002
REVERE	SUFF25	42786	663906	6.4%	286	0.46	110	0.001
MALDEN	MIDX21	53884	1398468	3.9%	360	0.58	138	0.002
CHELSEA	SUFF25	28710	663906	4.3%	192	0.31	74	0.001
EVERETT	MIDX21	35701	1398468	2.6%	239	0.38	92	0.001
SOMERVILLE	MIDX21	76210	1398468	5.4%	509	0.81	196	0.003
		TOTAL MET.BOSTON				11.22	2698	1.147
WORCESTER	WORC26	169759	709705	23.9%	1134	1.81	436	0.006
SPRINGFIELD	HAMD19	156983	456310	34.4%	1049	1.68	403	0.005
LOWELL	MIDX21	103439	1398468	7.4%	691	1.11	266	0.004
WALTHAM	MIDX21	57878	1398468	4.1%	387	0.62	149	0.002

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~OCT~~ DEC-FEB (TABLE C.4 MOBILE SECTION)

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                  TABLE B.4-23    INDUSTRIAL WOOD PRODUCTS EMISSIONS 1990
indWOODP
   SCC :       21-02-008-000
               STATIONARY SOURCE FUEL COMBUSTION
               INDUSTRIAL      WOOD PRODUCTS

   STATE ACTIVITY LEVEL :      415,647      TONS      (432,226 TONS - SSEIS 16,579)
                                            uniform   uniform
   COUNTY ACTIVITY LEVEL :         ANNUAL    OZ PO     CO PC       VOC TPY  VOC PO      NOX TPY  NOX PO      CO TPY  CO PO    CO PO
   ---------------------         ACTIVITY    ACTIV  ACTIVITY        EM.FAC  LB PSD       EM.FAC  LB PSD      EM.FAC   TPSD   LB PSD
   COUNTIES    POP 1990    %         TONS  /312*78  /312*78      1.4LB/TON     /78    2.8LB/TON     /78   47 LB/TON    /78      /78
   ========  =========  ====      =======  =======  =======      ========  ======    ========  ======     ======== =====   =====
 1 BARNSTABLE   186605   3.1%       12892     3223     3223          9.02  57.847       18.05 115.695       302.95 0.971  1942.0
 2 BERKSHIRE    139352   2.3%        9627     2407     2407          6.74  43.199       13.48  86.398       226.24 0.725  1450.2
 3 BRISTOL      506325   8.4%       34980     8745     8745         24.49 156.960       48.97 313.920       822.02 2.635  5269.4
 4 DUKES         11639   0.2%         804      201      201          0.56   3.608        1.13   7.216        18.90 0.061   121.1
 5 ESSEX        670080  11.1%       46293    11573    11573         32.40 207.724       64.81 415.448      1087.88 3.487  6973.6
 6 FRANKLIN      70092   1.2%        4842     1211     1211          3.39  21.728        6.78  43.457       113.79 0.365   729.5
 7 HAMPDEN      456310   7.6%       31524     7881     7881         22.07 141.455       44.13 282.911       740.82 2.374  4748.9
 8 HAMPSHIRE    146568   2.4%       10126     2531     2531          7.09  45.436       14.18  90.872       237.95 0.763  1525.3
 9 MIDDLESEX   1398468  23.2%       96614    24153    24153         67.63 433.523      135.26 867.046      2270.42 7.277 14554.0
10 NANTUCKET      6012   0.1%         415      104      104          0.29   1.864        0.58   3.727         9.76 0.031    62.6
11 NORFOLK      616087  10.2%       42563    10641    10641         29.79 190.986       59.59 381.972      1000.22 3.206  6411.7
12 PLYMOUTH     435276   7.2%       30071     7518     7518         21.05 134.935       42.10 269.870       706.67 2.265  4530.0
13 SUFFOLK      663906  11.0%       45866    11467    11467         32.11 205.810       64.21 411.620      1077.86 3.455  6909.3
14 WORCESTER    709705  11.8%       49030    12258    12258         34.32 220.007       68.64 440.015      1152.21 3.693  7386.0

   STATE       6016425 100.0%      415647   103912   103912        290.95 1865.08      581.91 3730.17      9767.70 31.307 62613.5

ACTIVITY LEVEL UNITS :        TONS                                                                               ANNUAL  ANNUAL PEAK CO PEAK CO
ACTIVITY LEVEL PROCESS :      BURNED                          NON-ATT     COUNTY      TOWN  COUNTY       %TOWN  ACTIV CO TPY    ACTIV   TPWD
ACTIVITY LEVEL METHOD :                                         TOWNS                POPUL   POPUL       /CNTY   TONS EF 47LB    TONS  /78
                                                              =======     ======  ======== =======      ====== ====== ======= ======= ======
PEAK OZ DAYS/WEEK :            6                               BOSTON     SUFF25    574283  663906       86.5% 39675  932.35    9919  2.988
 WEEKS/YEAR :                  52     PO THRUPUT : 25 %     CAMBRIDGE     MIDX21     95802 1398468        6.9%  6619  155.54    1655  0.499
                                                               QUINCY     NORF23     84985  616087       13.8%  5871  137.97    1468  0.442
PEAK CO DAYS/WEEK :            6                              MEDFORD     MIDX21     57407 1398468        4.1%  3966   93.20     991  0.299
WEEKS/YEAR :                   52     PC THRUPUT : 25 %        REVERE     SUFF25     42786  663906        6.4%  2956   69.46     739  0.223
                                                               MALDEN     MIDX21     53884 1398468        3.9%  3723   87.48     931  0.280
EMISSION FACTORS :     VOC:    1.4                            CHELSEA     SUFF25     28710  663906        4.3%  1983   46.61     496  0.149
                       NOX:    2.8                            EVERETT     MIDX21     35701 1398468        2.6%  2466   57.96     617  0.186
                       CO:     47.0                        SOMERVILLE     MIDX21     76210 1398468        5.4%  5265  123.73    1316  0.397
EMISSION FACTOR UNITS :        LB/TON    AP-42 TABLE 1.6-1                                       TOTAL MET.BOSTON  1704.31   18131  5.463
                                                            WORCESTER     WORC26    169759  709705       23.9% 11728  275.60    2932  0.883
RULE EFFECTIVENESS :           N/A                        SPRINGFIELD     HAMD19    156983  456310       34.4% 10845  254.86    2711  0.817
RULE PENETRATION :             N/A                             LOWELL     MIDX21    103439 1398468        7.4%  7146  167.93    1787  0.538
SIP RULE :                     NO                             WALTHAM     MIDX21     57878 1398468        4.1%  3999   93.97    1000  0.301

PO INTERVAL :                  1 HR
PC INTERVAL :                  8 HR

WEEKDAY:          83%      SAT : 17%      SUN :     0 %
```

COMMENTS: SUMMER JUNE-AUGUST, WINTER OCTOBER TO MARCH, PC THRUPUT ~~NOV-JAN~~ DEC-FEB (FOR AMS)

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APPENDIX C

C.1 MOBILE 5a EMISSION CALCULATIONS

C.2 MOBILE5a INPUT/OUTPUT FILES -OZONE

C.3 MHD TRANSPORTATION DATA & DOCUMENTATION

C.4 MOBILE5a INPUT/OUTPUT FILES - CO

C.5 CTPS DATA & DOCUMENTATION

APPENDIX C.1

MOBILE5a EMISSION CALCULATIONS

VOC - SUMMER

NOx - SUMMER

CO - SUMMER

CO - WINTER

ON-ROAD MOBILE5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -VOC
TONS PER SUMMER DAY

5vocmobct
nov 5 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	=========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	7.666	0.818	0.468	0.356	0.020	0.003	0.154	0.341	9.826
2	BERKSHIRE	9.150	0.952	0.543	0.471	0.023	0.003	0.322	0.367	11.831
3	BRISTOL	20.382	1.944	1.107	0.812	0.051	0.006	0.500	0.650	25.452
4	DUKES	0.452	0.059	0.034	0.025	0.001	0.000	0.011	0.027	0.609
5	ESSEX	27.588	2.613	1.490	1.129	0.069	0.008	0.756	0.895	34.548
6	FRANKLIN	5.787	0.668	0.380	0.342	0.015	0.002	0.239	0.289	7.722
7	HAMPDEN	18.464	1.798	1.026	0.786	0.046	0.005	0.559	0.645	23.329
8	HAMPSHIRE	7.529	0.776	0.444	0.337	0.020	0.002	0.182	0.280	9.570
9	MIDDLESEX	53.199	5.044	2.874	2.116	0.132	0.015	1.400	1.745	66.525
10	NANTUCKET	0.196	0.031	0.018	0.014	0.001	0.000	0.006	0.016	0.282
11	NORFOLK	28.94	2.719	1.548	1.139	0.072	0.008	0.76	0.927	36.113
12	PLYMOUTH	16.375	1.600	0.913	0.710	0.041	0.005	0.434	0.592	20.670
13	SUFFOLK	13.351	1.207	0.689	0.537	0.036	0.004	0.334	0.397	16.555
14	WORCESTER	30.620	3.065	1.743	1.439	0.077	0.009	1.024	1.212	39.189
	STATE qc	239.699	23.294	13.277	10.213	0.604	0.070	6.681	8.383	302.221 302.221

APPENDIX C.1-1

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC BARNSTABLE COUNTY

5m5emBARN 10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	TOTAL R1-R6	TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 BARN ADVMT	0	243	547	286	301	572	1949	0	460	536	377	98	440	1911	3860	
Summer*1.0188	0.000	247.568	557.284	291.377	306.659	582.754	1985.641	0.000	468.65	546.077	384.088	99.842	448.272	1946.927	3932.568	
SPEED	NA	60	40	35	37	27		NA	50	42	40	37	23			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	211.225	476.032	245.164	259.219	492.602	1684.242	0.000	389.212	456.793	286.030	76.819	344.900	1553.755	3237.996	
EM.FAC G/ML	0	1.98	1.99	2.16	2.09	2.53		0	1.78	1.94	1.99	2.09	2.79			
EMISS TPSD	0.000	0.461	1.044	0.584	0.597	1.374		0.000	0.764	0.977	0.627	0.177	1.061			7.666
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	14.483	34.774	22.028	23.367	44.406	139.059	0.000	33.555	40.574	48.702	9.575	42.989	175.395	314.454	
EM.FAC G/ML	0	2.31	2.19	2.34	2.27	2.68		0	2.02	2.14	2.19	2.27	2.93			
EMISS TPSD	0.000	0.037	0.084	0.057	0.058	0.131		0.000	0.075	0.096	0.118	0.024	0.139			0.818
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	7.378	17.722	11.218	11.898	22.611	70.826	0.000	17.106	20.642	24.812	4.882	21.921	89.362	160.189	
EM.FAC G/ML	0	2.57	2.45	2.62	2.55	3.03		0	2.24	2.4	2.45	2.55	3.32			
EMISS TPSD	0.000	0.021	0.048	0.032	0.033	0.076	0.000	0.000	0.042	0.055	0.067	0.014	0.080			0.468
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	3.614	7.300	3.846	3.067	5.828	23.655	0.000	9.186	6.771	7.720	2.496	11.207	37.380	61.035	
EM.FAC G/ML	0	4.19	4.83	5.22	5.05	6.21		0	4.38	4.72	4.83	5.05	6.99			
EMISS TPSD	0.000	0.017	0.039	0.022	0.017	0.040		0.000	0.044	0.035	0.041	0.014	0.086			0.356
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	2.921	6.576	3.380	3.588	6.818	23.283	0.000	5.389	6.280	3.956	1.058	4.752	21.435	44.719	
EM.FAC G/ML	0	0.3	0.37	0.42	0.4	0.52		0	0.32	0.36	0.37	0.4	0.59			
EMISS TPSD	0.000	0.001	0.003	0.002	0.002	0.004		0.000	0.002	0.002	0.002	0.000	0.003			0.020
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.173	0.446	0.262	0.307	0.583	1.771	0.000	0.422	0.491	0.615	0.120	0.538	2.186	3.956	
EM.FAC G/ML	0	0.42	0.53	0.59	0.56	0.73		0	0.45	0.51	0.53	0.56	0.84			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.003
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	6.78	11.65	4.31	3.68	6.99	33.416	0.00	12.84	11.25	10.33	2.50	11.21	48.125	81.541	
EM.FAC G/ML	0	1.27	1.59	1.77	1.69	2.21		0	1.36	1.53	1.59	1.69	2.52			
EMISS TPSD	0.000	0.009	0.020	0.008	0.007	0.017		0.000	0.019	0.019	0.018	0.005	0.031			0.154
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	0.99	2.79	1.17	1.53	2.91	9.389	0.00	0.94	3.28	1.92	2.40	10.76	19.289	28.678	
EM.FAC G/ML	0.00	10.82	10.28	10.49	10.39	11.00		0.00	10.12	10.22	10.28	10.39	11.35			
EMISS TPSD	0.000	0.012	0.032	0.013	0.018	0.035		0.000	0.010	0.037	0.022	0.027	0.135			0.341
														COUNTY TOTAL	3932.568	9.825

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC BERKSHIRE COUNTY

5m5emBERK 10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 BARN ADVMT	0	398	422	228	252	279	1579	825	1009	669	446	137	295	3381	4960	
Summer*1.0188	0.000	405.482	429.934	232.286	256.738	284.245	1608.685	840.510	1027.97	681.577	454.385	139.576	300.546	3444.563	5053.248	
SPEED	NA	48	39	40	39	20		60	53	38	40	33	29			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	345.958	367.249	195.446	217.020	240.272	1365.945	621.809	853.728	570.139	338.380	107.389	231.240	2722.687	4088.632	
EM.FAC G/ML	0	1.79	2.02	1.99	2.02	3.04		1.98	1.76	2.06	1.99	2.24	2.42			
EMISS TPSD	0.000	0.683	0.818	0.429	0.483	0.805		1.357	1.656	1.295	0.742	0.265	0.617			9.150
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	23.721	26.828	17.561	19.563	21.659	109.332	48.581	73.603	50.641	57.616	13.385	28.822	272.649	381.981	
EM.FAC G/ML	0	2.03	2.22	2.19	2.22	3.17		2.31	2.0	2.24	2.19	2.41	2.58			
EMISS TPSD	0.000	0.053	0.066	0.042	0.048	0.076		0.124	0.162	0.125	0.139	0.036	0.082			0.952
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	12.083	13.672	8.943	9.961	11.029	55.688	24.795	37.521	25.764	29.353	6.825	14.697	138.955	194.643	
EM.FAC G/ML	0	2.26	2.48	2.45	2.48	3.61		2.57	2.22	2.51	2.45	2.71	2.91			
EMISS TPSD	0.000	0.030	0.037	0.024	0.027	0.044	0.000	0.070	0.092	0.071	0.079	0.020	0.047			0.543
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	5.920	5.632	3.066	2.567	2.842	20.028	21.097	20.148	8.452	9.133	3.489	7.514	69.833	89.861	
EM.FAC G/ML	0	4.45	4.9	4.83	4.9	7.78		4.19	4.29	4.97	4.83	5.41	5.9			
EMISS TPSD	0.000	0.029	0.030	0.016	0.014	0.024		0.097	0.095	0.046	0.049	0.021	0.049			0.471
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	4.785	5.073	2.695	3.004	3.326	18.882	8.573	11.822	7.838	4.680	1.480	3.186	37.578	56.460	
EM.FAC G/ML	0	0.33	0.38	0.37	0.38	0.66		0.3	0.31	0.39	0.37	0.44	0.49			
EMISS TPSD	0.000	0.002	0.002	0.001	0.001	0.002		0.003	0.004	0.003	0.002	0.001	0.002			0.023
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.284	0.344	0.209	0.257	0.284	1.378	0.588	0.925	0.613	0.727	0.167	0.361	3.382	4.760	
EM.FAC G/ML	0	0.46	0.54	0.53	0.54	0.93		0.42	0.44	0.55	0.53	0.62	0.69			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.003
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	11.11	8.99	3.44	3.08	3.41	30.025	110.02	28.17	14.04	12.22	3.49	7.51	175.456	205.481	
EM.FAC G/ML	0	1.39	1.62	1.59	1.62	2.81		1.27	1.32	1.65	1.59	1.86	2.08			
EMISS TPSD	0.000	0.017	0.016	0.006	0.006	0.011		0.154	0.041	0.026	0.021	0.007	0.017			0.322
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	1.62	2.15	0.93	1.28	1.42	7.406	5.04	2.06	4.09	2.27	3.35	7.21	24.023	31.429	
EM.FAC G/ML	0.00	10.12	10.31	10.28	10.31	11.67		10.82	10.12	10.35	10.28	10.60	10.85			
EMISS TPSD	0.000	0.018	0.024	0.011	0.015	0.018		0.060	0.023	0.047	0.026	0.039	0.086			0.367
													COUNTY TOTAL		5053.248	11.831

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC BRISTOL COUNTY

5m5emBRIS
10/14/93

COUNTIES	INTER- STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 ADVMT	2900	1487	1780	1430	969	1467	10033	0	207	70	221	40	84	622	10655	
Summer*1.0188	2954.520	1514.956	1813.464	1456.884	987.217	1494.580	10221.620	0.000	210.89	71.316	225.155	40.752	85.579	633.694	10855.314	
SPEED	59	50	42	32	33	31		NA	58	40	39	34	36			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	2363.616	1292.560	1549.061	1225.822	834.495	1263.368	8528.922	0.000	175.145	59.656	167.673	31.355	65.845	499.673	9028.595	
EM.FAC G/ML	1.94	1.78	1.94	2.28	2.24	2.33		0	1.89	1.99	2.02	2.02	2.12			
EMISS TPSD	5.055	2.536	3.313	3.081	2.060	3.245		0.000	0.365	0.131	0.373	0.070	0.154			20.382
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	209.771	88.625	113.160	110.140	75.226	113.887	710.809	0.000	15.100	5.299	28.550	3.908	8.207	61.063	771.873	
EM.FAC G/ML	2.25	2.02	2.14	2.45	2.41	2.49		0	2.18	2.14	2.22	2.37	2.3			
EMISS TPSD	0.520	0.197	0.267	0.297	0.200	0.313		0.000	0.036	0.012	0.070	0.010	0.021			1.944
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	106.658	45.146	57.668	56.090	38.304	57.990	361.856	0.000	7.698	2.696	14.545	1.993	4.185	31.116	392.972	
EM.FAC G/ML	2.5	2.24	2.4	2.75	2.71	2.8		0	2.43	2.45	2.48	2.66	2.58			
EMISS TPSD	0.294	0.111	0.153	0.170	0.114	0.179	0.000	0.000	0.021	0.007	0.040	0.006	0.012			1.107
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	53.181	22.118	23.756	19.231	9.872	14.946	143.105	0.000	4.133	0.884	4.526	1.019	2.139	12.702	155.807	
EM.FAC G/ML	4.2	4.38	4.72	5.52	5.41	5.64		0	4.21	4.83	4.9	5.31	5.13			
EMISS TPSD	0.246	0.107	0.124	0.117	0.059	0.093		0.000	0.019	0.005	0.024	0.006	0.012			0.812
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	32.500	17.876	21.399	16.900	11.550	17.487	117.712	0.000	2.425	0.820	2.319	0.432	0.907	6.904	124.616	
EM.FAC G/ML	0.3	0.32	0.36	0.45	0.44	0.46		0	0.3	0.37	0.38	0.43	0.41			
EMISS TPSD	0.011	0.006	0.008	0.008	0.006	0.009		0.000	0.001	0.000	0.001	0.000	0.000			0.051
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	2.659	1.060	1.451	1.311	0.987	1.495	8.963	0.000	0.190	0.064	0.360	0.049	0.103	0.766	9.729	
EM.FAC G/ML	0.42	0.45	0.51	0.63	0.62	0.65		0	0.42	0.53	0.54	0.6	0.57			
EMISS TPSD	0.001	0.001	0.001	0.001	0.001	0.001		0.000	0.000	0.000	0.000	0.000	0.000			0.006
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	168.41	41.51	37.90	21.56	11.85	17.93	299.162	0.00	5.78	1.47	6.06	1.02	2.14	16.462	315.625	
EM.FAC G/ML	1.28	1.36	1.53	1.91	1.86	1.96		0	1.28	1.59	1.62	1.81	1.73			
EMISS TPSD	0.238	0.062	0.064	0.045	0.024	0.039		0.000	0.008	0.003	0.011	0.002	0.004			0.500
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	17.73	6.06	9.07	5.83	4.94	7.47	51.091	0.00	0.42	0.43	1.13	0.98	2.05	5.007	56.098	
EM.FAC G/ML	10.68	10.12	10.22	10.66	10.60	10.72		0.00	10.54	10.28	10.31	10.54	10.44			
EMISS TPSD	0.209	0.068	0.102	0.068	0.058	0.088		0.000	0.005	0.005	0.013	0.011	0.024			0.650
														COUNTY TOTAL	10855.314	25.452

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC DUKES COUNTY

5m5emDUKE
10/14/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 ADVMT	0	0	0	0	0	0	0	0	0	105	73	28	26	232	232	
Summer*1.0188	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	106.974	74.372	28.526	26.489	236.362	236.362	
SPEED	NA	NA	NA	NA	NA	NA		NA	NA	34	39	32	27			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	89.484	55.385	21.948	20.380	187.198	187.198	
EM.FAC G/ML	0	0	0	0	0	0	0	0	0	2.2	2.02	2.28	2.53			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.217	0.123	0.055	0.057			0.452
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.948	9.430	2.736	2.540	22.655	22.655	
EM.FAC G/ML	0	0	0	0	0	0		0	0	2.37	2.22	2.45	2.68			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.021	0.023	0.007	0.008			0.059
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.044	4.804	1.395	1.295	11.538	11.538	
EM.FAC G/ML	0	0	0	0	0	0		0	0	2.66	2.48	2.75	3.03			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.013	0.004	0.004			0.034
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.326	1.495	0.713	0.662	4.197	4.197	
EM.FAC G/ML	0	0	0	0	0	0		0	0	5.31	4.9	5.52	6.21			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.008	0.008	0.004	0.005			0.025
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.230	0.766	0.302	0.281	2.579	2.579	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0.43	0.38	0.45	0.52			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.001	0.000	0.000	0.000			0.001
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.119	0.034	0.032	0.281	0.281	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0.6	0.54	0.63	0.73			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.000
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	2.20	2.00	0.71	0.66	5.580	5.580	
EM.FAC G/ML	0	0	0	0	0	0		0	0	1.81	1.62	1.91	2.21			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.004	0.004	0.002	0.002			0.011
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.64	0.37	0.68	0.64	2.334	2.334	
EM.FAC G/ML	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	10.28	10.31	10.66	11.00			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.007	0.004	0.008	0.008			0.027
													COUNTY TOTAL		236.3616	0.609

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC ESSEX COUNTY

5m5emESSX 10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
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1 ADVMT	4020	1852	2765	1865	836	1769	13107	442	110	255	217	27	121	1172	14279	
Summer*1.0188	4095.576	1886.818	2816.982	1900.062	851.717	1802.257	13353.412	450.310	112.07	259.794	221.080	27.508	123.275	1194.034	14547.445	
SPEED	60	48	42	33	36	25		59	50	50	40	33	20			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	3276.461	1609.833	2406.266	1598.712	719.956	1523.448	11134.676	333.139	93.072	217.318	164.638	21.164	94.848	924.179	12058.855	
EM.FAC G/ML	1.98	1.78	1.94	2.24	2.12	2.65		1.94	1.78	1.78	1.99	2.24	3.04			
EMISS TPSD	7.151	3.159	5.146	3.947	1.682	4.450		0.712	0.183	0.426	0.361	0.052	0.318			27.588
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	290.786	110.379	175.780	143.645	64.901	137.332	922.822	26.028	8.024	19.303	28.033	2.638	11.822	95.848	1018.669	
EM.FAC G/ML	2.31	2.03	2.14	2.41	2.3	2.8		2.25	2.02	2.02	2.19	2.41	3.17			
EMISS TPSD	0.740	0.247	0.415	0.382	0.165	0.424		0.065	0.018	0.043	0.068	0.007	0.041			2.613
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	147.850	56.227	89.580	73.152	33.047	69.928	469.784	13.284	4.090	9.820	14.282	1.345	6.028	48.850	518.634	
EM.FAC G/ML	2.57	2.26	2.4	2.71	2.58	3.17		2.5	2.24	2.24	2.45	2.71	3.61			
EMISS TPSD	0.419	0.140	0.237	0.219	0.094	0.244	0.000	0.037	0.010	0.024	0.039	0.004	0.024			1.490
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	73.720	27.548	36.902	25.081	8.517	18.023	189.791	11.303	2.197	3.221	4.444	0.688	3.082	24.934	214.725	
EM.FAC G/ML	4.19	4.45	4.72	5.41	5.13	6.57		4.2	4.38	4.38	4.83	5.41	7.78			
EMISS TPSD	0.340	0.135	0.192	0.150	0.048	0.131		0.052	0.011	0.016	0.024	0.004	0.026			1.129
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	45.051	22.264	33.240	22.041	9.965	21.086	153.648	4.593	1.289	2.988	2.277	0.292	1.307	12.745	166.393	
EM.FAC G/ML	0.3	0.33	0.36	0.44	0.41	0.55		0.3	0.32	0.32	0.37	0.44	0.66			
EMISS TPSD	0.015	0.008	0.013	0.011	0.005	0.013		0.002	0.000	0.001	0.001	0.000	0.001			0.069
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	3.686	1.321	2.254	1.710	0.852	1.802	11.624	0.315	0.101	0.234	0.354	0.033	0.148	1.185	12.809	
EM.FAC G/ML	0.42	0.46	0.51	0.62	0.57	0.78		0.42	0.45	0.45	0.53	0.62	0.93			
EMISS TPSD	0.002	0.001	0.001	0.001	0.001	0.002		0.000	0.000	0.000	0.000	0.000	0.000			0.008
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	233.45	51.70	58.87	28.12	10.22	21.63	403.990	58.95	3.07	5.35	5.95	0.69	3.08	77.085	481.075	
EM.FAC G/ML	1.27	1.39	1.53	1.86	1.73	2.36		1.28	1.36	1.36	1.59	1.86	2.81			
EMISS TPSD	0.327	0.079	0.099	0.058	0.019	0.056		0.083	0.005	0.008	0.010	0.001	0.010			0.756
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	24.57	7.55	14.08	7.60	4.26	9.01	67.076	2.70	0.22	1.56	1.11	0.66	2.96	9.209	76.285	
EM.FAC G/ML	10.82	10.12	10.22	10.60	10.44	11.16		10.68	10.12	10.12	10.28	10.60	11.67			
EMISS TPSD	0.293	0.084	0.159	0.089	0.049	0.111		0.032	0.003	0.017	0.013	0.008	0.038			0.895
													COUNTY TOTAL		14547.445	34.548

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC FRANKLIN COUNTY

5m5emFRAN

10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
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1 ADVMT	209	54	86	88	49	76	562	614	675	473	542	116	343	2763	3325	
Summer*1.0188	212.929	55.015	87.617	89.654	49.921	77.429	572.566	625.543	687.69	481.892	552.190	118.181	349.448	2814.944	3387.510	
SPEED	58	48	36	32	34	33		58	48	44	43	35	30			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	170.343	46.939	74.842	75.435	42.198	65.451	475.209	462.777	571.127	403.103	411.216	90.928	268.866	2208.016	2683.225	
EM.FAC G/ML	1.89	1.79	2.12	2.28	2.2	2.24		1.89	1.79	1.88	1.91	2.16	2.37			
EMISS TPSD	0.355	0.093	0.175	0.190	0.102	0.162		0.964	1.127	0.835	0.866	0.216	0.702			5.787
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	15.118	3.218	5.467	6.778	3.804	5.900	40.286	36.156	49.239	35.805	70.018	11.334	33.512	236.063	276.348	
EM.FAC G/ML	2.18	2.03	2.3	2.45	2.37	2.41		2.18	2.03	2.1	2.12	2.34	2.53			
EMISS TPSD	0.036	0.007	0.014	0.018	0.010	0.016		0.087	0.110	0.083	0.164	0.029	0.093			0.668
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	7.687	1.639	2.786	3.452	1.937	3.004	20.505	18.454	25.101	18.216	35.671	5.779	17.088	120.308	140.814	
EM.FAC G/ML	2.43	2.26	2.58	2.75	2.66	2.71		2.43	2.26	2.35	2.37	2.62	2.85			
EMISS TPSD	0.021	0.004	0.008	0.010	0.006	0.009	0.000	0.049	0.063	0.047	0.093	0.017	0.054			0.380
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	3.833	0.803	1.148	1.183	0.499	0.774	8.241	15.701	13.479	5.975	11.099	2.955	8.736	57.945	66.186	
EM.FAC G/ML	4.21	4.45	5.13	5.52	5.31	5.41		4.21	4.45	4.61	4.66	5.22	5.76			
EMISS TPSD	0.018	0.004	0.006	0.007	0.003	0.005		0.073	0.066	0.030	0.057	0.017	0.055			0.342
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	2.342	0.649	1.034	1.040	0.584	0.906	6.555	6.381	7.908	5.542	5.688	1.253	3.704	30.475	37.030	
EM.FAC G/ML	0.3	0.33	0.41	0.45	0.43	0.44		0.3	0.33	0.35	0.35	0.42	0.48			
EMISS TPSD	0.001	0.000	0.000	0.001	0.000	0.000		0.002	0.003	0.002	0.002	0.001	0.002			0.015
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.192	0.039	0.070	0.081	0.050	0.077	0.508	0.438	0.619	0.434	0.884	0.142	0.419	2.935	3.443	
EM.FAC G/ML	0.42	0.46	0.57	0.63	0.6	0.62		0.42	0.46	0.49	0.5	0.59	0.67			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.002
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	12.14	1.51	1.83	1.33	0.60	0.93	18.331	81.88	18.84	9.93	14.85	2.95	8.74	137.198	155.529	
EM.FAC G/ML	1.28	1.39	1.73	1.91	1.81	1.86		1.28	1.39	1.48	1.5	1.77	2.02			
EMISS TPSD	0.017	0.002	0.003	0.003	0.001	0.002		0.116	0.029	0.016	0.025	0.006	0.019			0.239
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.28	0.22	0.44	0.36	0.25	0.39	2.931	3.75	1.38	2.89	2.76	2.84	8.39	22.004	24.935	
EM.FAC G/ML	10.54	10.12	10.44	10.66	10.54	10.60		10.54	10.12	10.18	10.20	10.49	10.78			
EMISS TPSD	0.015	0.002	0.005	0.004	0.003	0.005		0.044	0.015	0.032	0.031	0.033	0.100			0.289
													COUNTY TOTAL		3387.51	7.721

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC HAMPDEN COUNTY

m5emHAMD6a
10/14/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 BARN ADVMT	2159	178	2361	1517	573	1113	7901	833	0	343	354	57	173	1760	9661	
Summer*1.0188	2199.589	181.346	2405.387	1545.520	583.772	1133.924	8049.539	848.660	0.00	349.448	360.655	58.072	176.252	1793.088	9842.627	
SPEED	59	44	42	39	37	24		60	na	42	37	36	29			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	1759.671	154.725	2054.681	1300.400	493.463	958.506	6721.447	627.839	0.000	292.314	268.580	44.680	135.609	1369.021	8090.468	
EM.FAC G/ML	1.94	1.88	1.94	2.02	2.09	2.72		1.98	0	1.94	2.09	2.12	2.42			
EMISS TPSD	3.763	0.321	4.394	2.896	1.137	2.874		1.370	0.000	0.625	0.619	0.104	0.362			18.464
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	156.171	10.609	150.096	116.841	44.483	86.405	564.606	49.053	0.000	25.964	45.731	5.569	16.903	143.219	707.825	
EM.FAC G/ML	2.25	2.1	2.14	2.22	2.27	2.86		2.31	0	2.14	2.27	2.3	2.58			
EMISS TPSD	0.387	0.025	0.354	0.286	0.111	0.272		0.125	0.000	0.061	0.114	0.014	0.048			1.798
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	79.405	5.404	76.491	59.503	22.650	43.996	287.450	25.035	0.000	13.209	23.298	2.840	8.619	73.001	360.451	
EM.FAC G/ML	2.5	2.35	2.4	2.48	2.55	3.24		2.57	0	2.4	2.55	2.58	2.91			
EMISS TPSD	0.219	0.014	0.202	0.163	0.064	0.157	0.000	0.071	0.000	0.035	0.065	0.008	0.028			1.026
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	39.593	2.648	31.511	20.401	5.838	11.339	111.329	21.301	0.000	4.333	7.249	1.452	4.406	38.742	150.070	
EM.FAC G/ML	4.2	4.61	4.72	4.9	5.05	6.77		4.19	0	4.72	5.05	5.13	5.9			
EMISS TPSD	0.183	0.013	0.164	0.110	0.032	0.085		0.098	0.000	0.023	0.040	0.008	0.029			0.786
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	24.195	2.140	28.384	17.928	6.830	13.267	92.744	8.656	0.000	4.019	3.715	0.616	1.868	18.874	111.618	
EM.FAC G/ML	0.3	0.35	0.36	0.38	0.4	0.57		0.3	0	0.36	0.4	0.41	0.49			
EMISS TPSD	0.008	0.001	0.011	0.008	0.003	0.008		0.003	0.000	0.002	0.002	0.000	0.001			0.046
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	1.980	0.127	1.924	1.391	0.584	1.134	7.140	0.594	0.000	0.315	0.577	0.070	0.212	1.767	8.906	
EM.FAC G/ML	0.42	0.49	0.51	0.54	0.56	0.81		0.42	0	0.51	0.56	0.57	0.69			
EMISS TPSD	0.001	0.000	0.001	0.001	0.000	0.001		0.000	0.000	0.000	0.000	0.000	0.000			0.005
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	125.38	4.97	50.27	22.87	7.01	13.61	224.104	111.09	0.00	7.20	9.70	1.45	4.41	133.848	357.952	
EM.FAC G/ML	1.28	1.48	1.53	1.62	1.69	2.44		1.27	0	1.53	1.69	1.73	2.08			
EMISS TPSD	0.177	0.008	0.085	0.041	0.013	0.037		0.156	0.000	0.012	0.018	0.003	0.010			0.559
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	13.20	0.73	12.03	6.18	2.92	5.67	40.720	5.09	0.00	2.10	1.80	1.39	4.23	14.616	55.336	
EM.FAC G/ML	10.68	10.18	10.22	10.31	10.39	11.25		10.82	0.00	10.22	10.39	10.44	10.85			
EMISS TPSD	0.155	0.008	0.135	0.070	0.033	0.070		0.061	0.000	0.024	0.021	0.016	0.051			0.645
												COUNTY TOTAL			9842.6268	23.329

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC HAMPSHIRE COUNTY

m5emHAMD6a 10/14/93 COUNTIES	INTER- STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 ADVMT	270	117	764	556	155	294	2156	128	324	502	361	75	218	1608	3764	
Summer*1.0188	275.076	119.200	778.363	566.453	157.914	299.527	2196.533	130.406	330.09	511.438	367.787	76.410	222.098	1638.230	3834.763	
SPEED	59	46	35	32	28	20		59	46	43	33	39	37			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	220.061	101.701	664.878	476.613	133.485	253.190	1849.928	96.475	274.141	427.818	273.891	58.790	170.883	1301.996	3151.924	
EM.FAC G/ML	1.94	1.83	2.16	2.28	2.47	3.04		1.94	1.83	1.91	2.24	2.02	2.09			
EMISS TPSD	0.471	0.205	1.583	1.198	0.363	0.848		0.206	0.553	0.901	0.676	0.131	0.394			7.529
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	19.530	6.973	48.570	42.824	12.033	22.824	152.754	7.537	23.635	38.000	46.635	7.328	21.299	144.434	297.188	
EM.FAC G/ML	2.25	2.06	2.34	2.45	2.63	3.17		2.25	2.06	2.12	2.41	2.22	2.27			
EMISS TPSD	0.048	0.016	0.125	0.116	0.035	0.080		0.019	0.054	0.089	0.124	0.018	0.053			0.776
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	9.930	3.552	24.752	21.808	6.127	11.622	77.791	3.847	12.048	19.332	23.759	3.736	10.861	73.584	151.375	
EM.FAC G/ML	2.5	2.3	2.62	2.75	2.97	3.61		2.5	2.3	2.37	2.71	2.48	2.55			
EMISS TPSD	0.027	0.009	0.071	0.066	0.020	0.046	0.000	0.011	0.031	0.051	0.071	0.010	0.031			0.444
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	4.951	1.740	10.197	7.477	1.579	2.995	28.940	3.273	6.470	6.342	7.393	1.910	5.552	30.940	59.880	
EM.FAC G/ML	4.2	4.52	5.22	5.52	6.05	7.78		4.2	4.52	4.66	5.41	4.9	5.05			
EMISS TPSD	0.023	0.009	0.059	0.045	0.011	0.026		0.015	0.032	0.033	0.044	0.010	0.031			0.337
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	3.026	1.407	9.185	6.571	1.848	3.504	25.540	1.330	3.796	5.882	3.788	0.810	2.354	17.960	43.500	
EM.FAC G/ML	0.3	0.34	0.42	0.45	0.5	0.66		0.3	0.34	0.35	0.44	0.38	0.4			
EMISS TPSD	0.001	0.001	0.004	0.003	0.001	0.003		0.000	0.001	0.002	0.002	0.000	0.001			0.020
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.248	0.083	0.623	0.510	0.158	0.300	1.921	0.091	0.297	0.460	0.588	0.092	0.267	1.795	3.716	
EM.FAC G/ML	0.42	0.47	0.59	0.63	0.71	0.93		0.42	0.47	0.5	0.62	0.54	0.56			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.002
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	15.68	3.27	16.27	8.38	1.89	3.59	49.086	17.07	9.04	10.54	9.89	1.91	5.55	54.006	103.092	
EM.FAC G/ML	1.28	1.43	1.77	1.91	2.14	2.81		1.28	1.43	1.5	1.86	1.62	1.69			
EMISS TPSD	0.022	0.005	0.032	0.018	0.004	0.011		0.024	0.014	0.017	0.020	0.003	0.010			0.182
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.65	0.48	3.89	2.27	0.79	1.50	10.572	0.78	0.66	3.07	1.84	1.83	5.33	13.514	24.086	
EM.FAC G/ML	10.68	10.14	10.49	10.66	10.93	11.67		10.68	10.14	10.20	10.60	10.31	10.39			
EMISS TPSD	0.019	0.005	0.045	0.027	0.010	0.019		0.009	0.007	0.035	0.021	0.021	0.061			0.280
													COUNTY TOTAL		3834.7632	9.570

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC MIDDLESEX COUNTY

m5emMDSX6a
nov 5 93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 ADVMT	8186	3352	5663	3025	2158	3869	26253	527	166	486	244	67	183	1673	27926	
Summer*1.0188	8339.897	3415.018	5769.464	3081.870	2198.57	3941.737	26746.556	536.908	169.12	495.137	248.587	68.260	186.440	1704.452	28451.009	
SPEED	60	54	44	44	25	28		60	42	43	39	33	34			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	6671.917	2913.693	4928.276	2593.085	1858.45	3331.950	22297.374	397.204	140.455	414.182	185.123	52.519	143.447	1332.930	23630.304	
EM.FAC G/ML	1.98	1.75	1.88	1.88	2.65	2.47		1.98	1.94	1.91	2.02	2.24	2.2			
EMISS TPSD	14.562	5.621	10.213	5.374	5.429	9.072		0.867	0.300	0.872	0.412	0.130	0.348			53.199
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	592.133	199.779	360.015	232.989	167.531	300.360	1852.807	31.033	12.109	36.789	31.521	6.546	17.880	135.878	1988.684	
EM.FAC G/ML	2.31	2	2.1	2.1	2.8	2.63		2.31	2.14	2.12	2.22	2.41	2.37			
EMISS TPSD	1.508	0.440	0.833	0.539	0.517	0.871		0.079	0.029	0.086	0.077	0.017	0.047			5.044
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	301.070	101.768	183.469	118.652	85.305	152.939	943.203	15.839	6.173	18.716	16.059	3.338	9.117	69.241	1012.444	
EM.FAC G/ML	2.57	2.22	2.35	2.35	3.17	2.97		2.57	2.4	2.37	2.48	2.71	2.66			
EMISS TPSD	0.853	0.249	0.475	0.307	0.298	0.501	0.000	0.045	0.016	0.049	0.044	0.010	0.027			2.874
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	150.118	49.859	75.580	40.681	21.986	39.417	377.641	13.476	3.315	6.140	4.997	1.706	4.661	34.295	411.936	
EM.FAC G/ML	4.19	4.27	4.61	4.61	6.57	6.05		4.19	4.72	4.66	4.9	5.41	5.31			
EMISS TPSD	0.693	0.235	0.384	0.207	0.159	0.263		0.062	0.017	0.032	0.027	0.010	0.027			2.116
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	91.739	40.297	68.080	35.750	25.723	46.118	307.707	5.476	1.945	5.694	2.560	0.724	1.976	18.376	326.083	
EM.FAC G/ML	0.3	0.31	0.35	0.35	0.55	0.5		0.3	0.36	0.35	0.38	0.44	0.43			
EMISS TPSD	0.030	0.014	0.026	0.014	0.016	0.025		0.002	0.001	0.002	0.001	0.000	0.001			0.132
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	7.506	2.391	4.616	2.774	2.199	3.942	23.426	0.376	0.152	0.446	0.398	0.082	0.224	1.677	25.103	
EM.FAC G/ML	0.42	0.47	0.49	0.49	0.78	0.71		0.42	0.51	0.5	0.54	0.62	0.6			
EMISS TPSD	0.003	0.001	0.002	0.001	0.002	0.003		0.000	0.000	0.000	0.000	0.000	0.000			0.015
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	475.37	93.57	120.58	45.61	26.38	47.30	808.823	70.28	4.63	10.20	6.69	1.71	4.66	98.169	906.992	
EM.FAC G/ML	1.27	1.31	1.48	1.48	2.36	2.14		1.27	1.53	1.5	1.62	1.86	1.81			
EMISS TPSD	0.665	0.135	0.197	0.074	0.069	0.112		0.098	0.008	0.017	0.012	0.003	0.009			1.400
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	50.04	13.66	28.85	12.33	10.99	19.71	135.576	3.22	0.34	2.97	1.24	1.64	4.47	13.886	149.462	
EM.FAC G/ML	10.82	10.12	10.18	10.18	11.16	10.93		10.82	10.22	10.20	10.31	10.60	10.54			
EMISS TPSD	0.597	0.152	0.324	0.138	0.135	0.237		0.038	0.004	0.033	0.014	0.019	0.052			1.745
														COUNTY TOTAL	28451.008	66.524

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC NANTUCKET COUNTY

m5emNANT6a 10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 ADVMT	0	0	0	0	0	0	0	0	0	0	55	14	30	99	99	
Summer*1.0188	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	56.034	14.263	30.564	100.861	100.861	
SPEED	NA	NA	NA	NA	NA	NA		NA	NA	NA	35	40	23			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	41.729	10.974	23.516	76.219	76.219	
EM.FAC G/ML	0	0	0	0	0	0	0	0	0	0	2.16	1.99	2.79			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.099	0.024	0.072			0.196
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.105	1.368	2.931	11.404	11.404	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	2.34	2.19	2.93			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.018	0.003	0.009			0.031
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.620	0.697	1.495	5.812	5.812	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	2.62	2.45	3.32			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.002	0.005			0.018
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.126	0.357	0.764	2.247	2.247	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	5.22	4.83	6.99			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.006	0.002	0.006			0.014
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.577	0.151	0.324	1.052	1.052	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	0.42	0.37	0.59			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.001
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.017	0.037	0.143	0.143	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	0.59	0.53	0.84			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.000
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	1.51	0.36	0.76	2.628	2.628	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	1.77	1.59	2.52			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.003	0.001	0.002			0.006
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.28	0.34	0.73	1.356	1.356	
EM.FAC G/ML	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	10.49	10.28	11.35			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.003	0.004	0.009			0.016
													COUNTY TOTAL		100.8612	0.282

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                    MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC NORFOLK COUNTY

m5emNORF6a
  10/14/93     INTER-   FREEWY  PRINCIP    MINOR                           VMT     INTER PRINCIPL    MINOR    MAJOR    MINOR                VMT        VMT    TOTAL
                STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL       TOTAL     STATE   ARTERY   ARTERY  COLLECT  COLLECT    LOCAL     TOTAL      TOTAL EMISSIONS
  COUNTIES     URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6       U1-U6    RURAL1   RURAL2   RURAL3   RURAL4   RURAL5   RURAL6     R1-R6  ALL ROADS VOC TPSD
  --------    -------  -------  -------  -------  -------  -------      ======   -------  -------  -------  -------  -------  -------   ======= ========= ========
 1 ADVMT         5016     1107     3652     1967      954     1959       14655       126        0      117       50        8       29       330      14985
Summer*1.0188 5110.301 1127.812 3720.658 2003.980 971.935 1995.829 14930.514   128.369     0.00  119.200   50.940    8.150   29.545   336.204  15266.718
       SPEED       60       51       39       36       32       29                  60       NA       52       39       39       31


i  LDGV VMIX       80    85.32    85.42    84.14    84.53    84.53               73.98    83.05    83.65    74.47    76.94    76.94
   SUMM ADVMT 4088.241 962.249 3178.186 1686.148 821.577 1687.074 12423.475     94.967    0.000   99.710   37.935    6.271   22.732   261.616  12685.091
   EM.FAC G/ML   1.98     1.77     2.02     2.12     2.28     2.42                1.98        0     1.76     2.02     2.02     2.33
   EMISS TPSD   8.923    1.877    7.077    3.940    2.065    4.500               0.207    0.000    0.193    0.084    0.014    0.058                          28.940

ii  LDGT1 VMIX    7.1     5.85     6.24     7.56     7.62     7.62                5.78     7.16     7.43    12.68     9.59     9.59
   SUMM ADVMT 362.831   65.977  232.169  151.501   74.061  152.082    1038.622     7.420    0.000    8.857   6.459,    0.782    2.833    26.350   1064.972
   EM.FAC G/ML   2.31     2.01     2.22      2.3     2.45     2.58                2.31        0     2.01     2.22     2.22     2.49
   EMISS TPSD   0.924    0.146    0.568    0.384    0.200    0.433               0.019    0.000    0.020    0.016    0.002    0.008                           2.719

iii LDGT2 VMIX   3.61     2.98     3.18     3.85     3.88     3.88                2.95     3.65     3.78     6.46     4.89     4.89
   SUMM ADVMT 184.482   33.609  118.317   77.153   37.711   77.438     528.710     3.787    0.000    4.506    3.291    0.399    1.445    13.427    542.137
   EM.FAC G/ML   2.57     2.24     2.48     2.58     2.75     2.91                2.57        0     2.23     2.48     2.48      2.8
   EMISS TPSD   0.523    0.083    0.323    0.219    0.114    0.248       0.000   0.011    0.000    0.011    0.009    0.001    0.004                           1.548

iv  HDGV VMIX    1.80     1.46     1.31     1.32     1.00     1.00                2.51     1.96     1.24     2.01     2.50     2.50
   SUMM ADVMT  91.985   16.466   48.741   26.453    9.719   19.958     213.322     3.222    0.000    1.478    1.024    0.204    0.739     6.666    219.989
   EM.FAC G/ML   4.19     4.35      4.9     5.13     5.52      5.9                4.19        0     4.32      4.9      4.9     5.64
   EMISS TPSD   0.425    0.079    0.263    0.150    0.059    0.130               0.015    0.000    0.007    0.006    0.001    0.005                           1.139

v   LDDV VMIX    1.10     1.18     1.18     1.16     1.17     1.17                1.02     1.15     1.15     1.03     1.06     1.06
   SUMM ADVMT  56.213   13.308   43.904   23.246   11.372   23.351     171.394     1.309    0.000    1.371    0.525    0.086    0.313     3.604    174.999
   EM.FAC G/ML    0.3     0.32     0.38     0.41     0.45     0.49                 0.3        0     0.31     0.38     0.38     0.46
   EMISS TPSD   0.019    0.005    0.018    0.011    0.006    0.013               0.000    0.000    0.000    0.000    0.000    0.000                           0.072

vi  LDDT VMIX    0.09     0.07     0.08     0.09     0.10     0.10                0.07     0.09     0.09     0.16     0.12     0.12
   SUMM ADVMT   4.599    0.789    2.977    1.804    0.972    1.996      13.137     0.090    0.000    0.107    0.082    0.010    0.035     0.324     13.460
   EM.FAC G/ML   0.42     0.45     0.54     0.57     0.63     0.69                0.42        0     0.44     0.54     0.54     0.65
   EMISS TPSD   0.002    0.000    0.002    0.001    0.001    0.002               0.000    0.000    0.000    0.000    0.000    0.000                           0.008

vii HDDV VMIX    5.70     2.74     2.09     1.48     1.20     1.20               13.09     2.74     2.06     2.69     2.50     2.50
   SUMMER VMT  291.29    30.90    77.76    29.66    11.66    23.95     465.223     16.80     0.00     2.46     1.37     0.20     0.74    21.572    486.795
   EM.FAC G/ML   1.27     1.35     1.62     1.73     1.91     2.08                1.27        0     1.33     1.62     1.62     1.96
   EMISS TPSD   0.408    0.046    0.139    0.057    0.025    0.055               0.024    0.000    0.004    0.002    0.000    0.002                           0.760

iix MC VMIX      0.60     0.40     0.50     0.40     0.50     0.50                0.60     0.20     0.60     0.50     2.40     2.40
   SUMM ADVMT   30.66     4.51    18.60     8.02     4.86     9.98      76.631      0.77     0.00     0.72     0.25     0.20     0.71     2.645     79.276
   EM.FAC G/ML  10.82    10.12    10.31    10.44    10.66    10.85               10.82     0.00    10.12    10.31    10.31    10.72
   EMISS TPSD   0.366    0.050    0.211    0.092    0.057    0.119               0.009    0.000    0.008    0.003    0.002    0.008                           0.927

                                                                                                                   COUNTY TOTAL       15266.718   36.112
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MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC PLYMOUTH COUNTY

m5emPLYM6a 10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 ADVMT	241	704	2222	1269	616	945	5997	811	628	309	410	148	329	2635	8632	
Summer*1.0188	245.531	717.235	2263.774	1292.857	627.581	962.766	6109.744	826.247	639.81	314.809	417.708	150.782	335.185	2684.538	8794.282	
SPEED	60	60	44	40	29	28		60	58	51	48	31	27			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	196.425	611.945	1933.715	1087.810	530.494	813.826	5174.215	611.257	531.359	263.338	311.067	116.012	257.891	2090.925	7265.140	
EM.FAC G/ML	1.98	1.98	1.88	1.99	2.42	2.47		1.98	1.89	1.77	1.79	2.33	2.53			
EMISS TPSD	0.429	1.336	4.007	2.386	1.415	2.216		1.334	1.107	0.514	0.614	0.298	0.719			16.375
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	17.433	41.958	141.259	97.740	47.822	73.363	419.575	47.757	45.810	23.390	52.965	14.460	32.144	216.527	636.102	
EM.FAC G/ML	2.31	2.31	2.1	2.19	2.58	2.63		2.31	2.18	2.01	2.03	2.49	2.68			
EMISS TPSD	0.044	0.107	0.327	0.236	0.136	0.213		0.122	0.110	0.052	0.119	0.040	0.095			1.600
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	8.864	21.374	71.988	49.775	24.350	37.355	213.706	24.374	23.353	11.900	26.984	7.373	16.391	110.375	324.080	
EM.FAC G/ML	2.57	2.57	2.35	2.45	2.91	2.97		2.57	2.43	2.24	2.26	2.8	3.03			
EMISS TPSD	0.025	0.061	0.186	0.134	0.078	0.122	0.000	0.069	0.063	0.029	0.067	0.023	0.055			0.913
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	4.420	10.472	29.655	17.066	6.276	9.628	77.516	20.739	12.540	3.904	8.396	3.770	8.380	57.728	135.244	
EM.FAC G/ML	4.19	4.19	4.61	4.83	5.9	6.05		4.19	4.21	4.35	4.45	5.64	6.21			
EMISS TPSD	0.020	0.048	0.151	0.091	0.041	0.064		0.096	0.058	0.019	0.041	0.023	0.057			0.710
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	2.701	8.463	26.713	14.997	7.343	11.264	71.481	8.428	7.358	3.620	4.302	1.598	3.553	28.859	100.340	
EM.FAC G/ML	0.3	0.3	0.35	0.37	0.49	0.5		0.3	0.3	0.32	0.33	0.46	0.52			
EMISS TPSD	0.001	0.003	0.010	0.006	0.004	0.006		0.003	0.002	0.001	0.002	0.001	0.002			0.041
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.221	0.502	1.811	1.164	0.628	0.963	5.288	0.578	0.576	0.283	0.668	0.181	0.402	2.689	7.977	
EM.FAC G/ML	0.42	0.42	0.49	0.53	0.69	0.71		0.42	0.42	0.45	0.46	0.65	0.73			
EMISS TPSD	0.000	0.000	0.001	0.001	0.000	0.001		0.000	0.000	0.000	0.000	0.000	0.000			0.005
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	14.00	19.65	47.31	19.13	7.53	11.55	119.179	108.16	17.53	6.49	11.24	3.77	8.38	155.557	274.736	
EM.FAC G/ML	1.27	1.27	1.48	1.59	2.08	2.14		1.27	1.28	1.35	1.39	1.96	2.21			
EMISS TPSD	0.020	0.028	0.077	0.034	0.017	0.027		0.151	0.025	0.010	0.017	0.008	0.020			0.434
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.47	2.87	11.32	5.17	3.14	4.81	28.784	4.96	1.28	1.89	2.09	3.62	8.04	21.878	50.662	
EM.FAC G/ML	10.82	10.82	10.18	10.28	10.85	10.93		10.82	10.54	10.12	10.12	10.72	11.00			
EMISS TPSD	0.018	0.034	0.127	0.059	0.038	0.058		0.059	0.015	0.021	0.023	0.043	0.098			0.592
														COUNTY TOTAL	8794.2816	20.668

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC SUFFOLK COUNTY

m5emSUFF6a
10/14/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 ADVMT	1531	1414	1957	858	280	827	6867	NA	NA	NA	NA	NA	NA	0	6867	
Summer*1.0188	1559.783	1440.583	1993.792	874.130	285.264	842.548	6996.100	0.000	0.00	0.000	0.000	0.000	0.000	0.000	6996.100	
SPEED	57	43	34	30	31	29		NA	NA	NA	NA	NA	NA			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	1247.826	1229.106	1703.097	735.493	241.134	712.205	5868.861	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5868.861	
EM.FAC G/ML	1.84	1.91	2.02	2.37	2.33	2.42										
EMISS TPSD	2.531	2.588	3.792	1.921	0.619	1.900		0.000	0.000	0.000	0.000	0.000	0.000			13.351
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	110.745	84.274	124.413	66.084	21.737	64.202	471.455	0.000	0.000	0.000	0.000	0.000	0.000	0.000	471.455	
EM.FAC G/ML	2.12	2.12	2.37	2.53	2.49	2.58										
EMISS TPSD	0.259	0.197	0.325	0.184	0.060	0.183		0.000	0.000	0.000	0.000	0.000	0.000			1.207
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	56.308	42.929	63.403	33.654	11.068	32.691	240.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	240.053	
EM.FAC G/ML	2.36	2.37	2.66	2.85	2.8	2.91										
EMISS TPSD	0.146	0.112	0.186	0.106	0.034	0.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.689
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	28.076	21.033	26.119	11.539	2.853	8.425	98.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.044	
EM.FAC G/ML	4.22	4.66	5.31	5.76	5.64	5.9										
EMISS TPSD	0.131	0.108	0.153	0.073	0.018	0.055		0.000	0.000	0.000	0.000	0.000	0.000			0.537
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	17.158	16.999	23.527	10.140	3.338	9.858	81.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	81.019	
EM.FAC G/ML	0.3	0.35	0.43	0.48	0.46	0.49										
EMISS TPSD	0.006	0.007	0.011	0.005	0.002	0.005		0.000	0.000	0.000	0.000	0.000	0.000			0.036
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	1.404	1.008	1.595	0.787	0.285	0.843	5.922	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.922	
EM.FAC G/ML	0.43	0.5	0.6	0.67	0.65	0.69										
EMISS TPSD	0.001	0.001	0.001	0.001	0.000	0.001		0.000	0.000	0.000	0.000	0.000	0.000			0.004
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	88.91	39.47	41.67	12.94	3.42	10.11	196.521	0.00	0.00	0.00	0.00	0.00	0.00	0.000	196.521	
EM.FAC G/ML	1.29	1.5	1.81	2.02	1.96	2.08										
EMISS TPSD	0.126	0.065	0.083	0.029	0.007	0.023		0.000	0.000	0.000	0.000	0.000	0.000			0.334
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	9.36	5.76	9.97	3.50	1.43	4.21	34.226	0.00	0.00	0.00	0.00	0.00	0.00	0.000	34.226	
EM.FAC G/ML	10.40	10.20	10.54	10.78	10.72	10.85										
EMISS TPSD	0.107	0.065	0.116	0.042	0.017	0.050		0.000	0.000	0.000	0.000	0.000	0.000			0.397
												COUNTY TOTAL			6996.0996	16.556

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -VOC WORCESTER COUNTY

m5emWORC6a
10/14/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
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1 BARN ADVMT	3886	1314	3473	1460	738	1208	12079	1465	453	1520	981	205	562	5186	17265	
Summer*1.0188	3959.057	1338.703	3538.292	1487.448	751.874	1230.710	12306.085	1492.54	461.52	1548.58	999.443	208.854	572.566	5283.497	17589.582	
SPEED	54	57	45	39	40	28		59	43	53	40	35	25			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	3167.245	1142.182	3022.409	1251.539	635.559	1040.320	10259.254	1104.18	383.29	1295.38	744.285	160.692	440.532	4128.365	14387.619	
EM.FAC G/ML	1.75	1.84	1.86	2.02	1.99	2.47		1.94	1.91	1.76	1.99	2.16	2.65			
EMISS TPSD	6.110	2.317	6.197	2.787	1.394	2.832		2.361	0.807	2.513	1.633	0.383	1.287			30.620
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	281.093	78.314	220.789	112.451	57.293	93.780	843.721	86.269	33.045	115.059	126.729	20.029	54.909	436.040	1279.761	
EM.FAC G/ML	2	2.12	2.08	2.22	2.17	2.63		2.25	2.12	2	2.19	2.34	2.8			
EMISS TPSD	0.620	0.183	0.506	0.275	0.137	0.272		0.214	0.077	0.254	0.306	0.052	0.169			3.065
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	142.922	39.893	112.518	57.267	29.173	47.752	429.524	44.030	16.845	58.536	64.564	10.213	27.998	222.187	651.711	
EM.FAC G/ML	2.22	2.36	2.32	2.48	2.45	2.97		2.5	2.37	2.22	2.45	2.62	3.17			
EMISS TPSD	0.350	0.104	0.288	0.157	0.079	0.156	0.000	0.121	0.044	0.143	0.174	0.029	0.098			1.743
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	71.263	19.545	46.352	19.634	7.519	12.307	176.620	37.463	9.046	19.202	20.089	5.221	14.314	105.335	281.955	
EM.FAC G/ML	4.27	4.22	4.57	4.9	4.83	6.05		4.2	4.66	4.29	4.83	5.22	6.57			
EMISS TPSD	0.335	0.091	0.233	0.106	0.040	0.082		0.173	0.046	0.091	0.107	0.030	0.104			1.439
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	43.550	15.797	41.752	17.254	8.797	14.399	141.549	15.224	5.307	17.809	10.294	2.214	6.069	56.917	198.466	
EM.FAC G/ML	0.31	0.3	0.34	0.38	0.37	0.5		0.3	0.35	0.31	0.37	0.42	0.55			
EMISS TPSD	0.015	0.005	0.016	0.007	0.004	0.008		0.005	0.002	0.006	0.004	0.001	0.004			0.077
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	3.563	0.937	2.831	1.339	0.752	1.231	10.652	1.045	0.415	1.394	1.599	0.251	0.687	5.391	16.043	
EM.FAC G/ML	0.43	0.43	0.48	0.54	0.53	0.71		0.42	0.5	0.44	0.53	0.59	0.78			
EMISS TPSD	0.002	0.000	0.001	0.001	0.000	0.001		0.000	0.000	0.001	0.001	0.000	0.001			0.009
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	225.67	36.68	73.95	22.01	9.02	14.77	382.102	195.37	12.65	31.90	26.89	5.22	14.31	286.340	668.443	
EM.FAC G/ML	1.31	1.29	1.45	1.62	1.59	2.14		1.28	1.5	1.32	1.59	1.77	2.36			
EMISS TPSD	0.326	0.052	0.118	0.039	0.016	0.035		0.276	0.021	0.046	0.047	0.010	0.037			1.024
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	23.75	5.35	17.69	5.95	3.76	6.15	62.663	8.96	0.92	9.29	5.00	5.01	13.74	42.921	105.584	
EM.FAC G/ML	10.12	10.40	10.16	10.31	10.28	10.93		10.68	10.20	10.12	10.28	10.49	11.16			
EMISS TPSD	0.265	0.061	0.198	0.068	0.043	0.074		0.105	0.010	0.104	0.057	0.058	0.169			1.212
														COUNTY TOTAL	17589.582	39.189

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -NOX
TONS PER SUMMER DAY

5noxmobct
Oct 18 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	=========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	6.161	0.702	0.380	0.435	0.074	0.008	1.678	0.030	9.468
2	BERKSHIRE	8.480	0.927	0.503	0.679	0.102	0.010	5.257	0.037	15.995
3	BRISTOL	19.102	1.941	1.054	1.179	0.227	0.020	7.812	0.070	31.405
4	DUKES	0.338	0.049	0.026	0.029	0.004	0.001	0.104	0.002	0.553
5	ESSEX	25.714	2.592	1.407	1.633	0.312	0.028	12.413	0.096	44.195
6	FRANKLIN	5.479	0.658	0.358	0.500	0.066	0.007	3.837	0.029	10.934
7	HAMPDEN	17.044	1.768	0.959	1.137	0.204	0.019	9.258	0.069	30.458
8	HAMPSHIRE	6.011	0.669	0.363	0.431	0.072	0.007	2.286	0.027	9.866
9	MIDDLESEX	51.904	5.188	2.817	3.174	0.628	0.056	23.836	0.193	87.796
10	NANTUCKET	0.136	0.024	0.013	0.015	0.002	0.000	0.050	0.001	0.241
11	NORFOLK	27.684	2.780	1.509	1.679	0.329	0.029	12.679	0.103	46.792
12	PLYMOUTH	15.257	1.567	0.851	1.023	0.184	0.017	6.998	0.060	25.957
13	SUFFOLK	11.623	1.117	0.606	0.717	0.138	0.012	4.421	0.040	18.674
14	WORCESTER	30.585	3.199	1.736	2.155	0.366	0.034	16.395	0.130	54.600
	STATE qc	225.518	23.181	12.582	14.786	2.708	0.248	107.024	0.887	386.934

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX BARNSTABLE COUNTY

m5NXBARN

10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 BARN ADVMT	0	243	547	286	301	572	1949	0	460	536	377	98	440	1911	3860	
Summer*1.0188	0.000	247.568	557.284	291.377	306.659	582.754	1985.641	0.000	468.65	546.077	384.088	99.842	448.272	1946.927	3932.568	
SPEED	NA	60	40	35	37	27		NA	50	42	40	37	23			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	211.225	476.032	245.164	259.219	492.602	1684.242	0.000	389.212	456.793	286.030	76.819	344.900	1553.755	3237.996	
EM.FAC G/ML	0	2.59	1.67	1.64	1.65	1.6		0	1.85	1.67	1.67	1.65	1.57			
EMISS TPSD	0.000	0.603	0.876	0.443	0.471	0.869		0.000	0.794	0.841	0.527	0.140	0.597			6.161
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	14.483	34.774	22.028	23.367	44.406	139.059	0.000	33.555	40.574	48.702	9.575	42.989	175.395	314.454	
EM.FAC G/ML	0	3.07	2	1.96	1.98	1.88		0	2.21	2.01	2	1.98	1.82			
EMISS TPSD	0.000	0.049	0.077	0.048	0.051	0.092		0.000	0.082	0.090	0.107	0.021	0.086			0.702
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	7.378	17.722	11.218	11.898	22.611	70.826	0.000	17.106	20.642	24.812	4.882	21.921	89.362	160.189	
EM.FAC G/ML	0	3.29	2.12	2.08	2.1	2		0	2.36	2.13	2.12	2.1	1.94			
EMISS TPSD	0.000	0.027	0.041	0.026	0.028	0.050	0.000	0.000	0.044	0.048	0.058	0.011	0.047			0.380
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	3.614	7.300	3.846	3.067	5.828	23.655	0.000	9.186	6.771	7.720	2.496	11.207	37.380	61.035	
EM.FAC G/ML	0	7.54	6.56	6.31	6.41	5.92		0	7.05	6.66	6.56	6.41	5.73			
EMISS TPSD	0.000	0.030	0.053	0.027	0.022	0.038		0.000	0.071	0.050	0.056	0.018	0.071			0.435
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	2.921	6.576	3.380	3.588	6.818	23.283	0.000	5.389	6.280	3.956	1.058	4.752	21.435	44.719	
EM.FAC G/ML	0	2.25	1.42	1.38	1.39	1.43		0	1.66	1.45	1.42	1.39	1.5			
EMISS TPSD	0.000	0.007	0.010	0.005	0.005	0.011		0.000	0.010	0.010	0.006	0.002	0.008			0.074
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.173	0.446	0.262	0.307	0.583	1.771	0.000	0.422	0.491	0.615	0.120	0.538	2.186	3.956	
EM.FAC G/ML	0	2.6	1.64	1.6	1.61	1.65		0	1.92	1.67	1.64	1.61	1.73			
EMISS TPSD	0.000	0.000	0.001	0.000	0.001	0.001		0.000	0.001	0.001	0.001	0.000	0.001			0.008
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	6.78	11.65	4.31	3.68	6.99	33.416	0.00	12.84	11.25	10.33	2.50	11.21	48.125	81.541	
EM.FAC G/ML	0	27.13	17.13	16.69	16.79	17.23		0	20.68	17.48	17.13	16.79	18.11			
EMISS TPSD	0.000	0.203	0.220	0.079	0.068	0.133		0.000	0.293	0.217	0.195	0.046	0.224			1.678
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	0.99	2.79	1.17	1.53	2.91	9.389	0.00	0.94	3.28	1.92	2.40	10.76	19.289	28.678	
EM.FAC G/ML	0.00	1.47	1.01	0.97	0.99	0.87		0.00	1.13	1.02	1.01	0.99	0.81			
EMISS TPSD	0.000	0.002	0.003	0.001	0.002	0.003		0.000	0.001	0.004	0.002	0.003	0.010			0.030
													COUNTY TOTAL		3932.568	9.467

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX BERKSHIRE COUNTY

m5nxBERK5 10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 BARN ADVMT	0	398	422	228	252	279	1579	825	1009	669	446	137	295	3381	4960	
Summer*1.0188	0.000	405.482	429.934	232.286	256.738	284.245	1608.685	840.510	1027.97	681.577	454.385	139.576	300.546	3444.563	5053.248	
SPEED	NA	48	39	40	39	20		60	53	38	40	33	29			
i LDGV VMIX	0	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	345.958	367.249	195.446	217.020	240.272	1365.945	621.809	853.728	570.139	338.380	107.389	231.240	2722.687	4088.632	
EM.FAC G/ML	0	1.7	1.66	1.67	1.66	1.55		2.59	2.07	1.66	1.67	1.63	1.61			
EMISS TPSD	0.000	0.648	0.672	0.360	0.397	0.411		1.775	1.948	1.043	0.623	0.193	0.410			8.480
ii LDGT1 VMIX	0	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	23.721	26.828	17.561	19.563	21.659	109.332	48.581	73.603	50.641	57.616	13.385	28.822	272.649	381.981	
EM.FAC G/ML	0	2.04	1.99	2	1.99	1.76		3.07	2.47	1.98	2	1.94	1.9			
EMISS TPSD	0.000	0.053	0.059	0.039	0.043	0.042		0.164	0.200	0.111	0.127	0.029	0.060			0.927
iii LDGT2 VMIX	0	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	12.083	13.672	8.943	9.961	11.029	55.688	24.795	37.521	25.764	29.353	6.825	14.697	138.955	194.643	
EM.FAC G/ML	0	2.17	2.11	2.12	2.11	1.88		3.29	2.64	2.1	2.12	2.06	2.02			
EMISS TPSD	0.000	0.029	0.032	0.021	0.023	0.023	0.000	0.090	0.109	0.060	0.069	0.015	0.033			0.503
iv HDGV VMIX	0.00	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	5.920	5.632	3.066	2.567	2.842	20.028	21.097	20.148	8.452	9.133	3.489	7.514	69.833	89.861	
EM.FAC G/ML	0	6.95	6.51	6.56	6.51	5.58		7.54	7.2	6.46	6.56	6.22	6.02			
EMISS TPSD	0.000	0.045	0.040	0.022	0.018	0.017		0.175	0.160	0.060	0.066	0.024	0.050			0.679
v LDDV VMIX	0.00	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	4.785	5.073	2.695	3.004	3.326	18.882	8.573	11.822	7.838	4.680	1.480	3.186	37.578	56.460	
EM.FAC G/ML	0	1.59	1.41	1.42	1.41	1.58		2.25	1.8	1.4	1.42	1.38	1.4			
EMISS TPSD	0.000	0.008	0.008	0.004	0.005	0.006		0.021	0.023	0.012	0.007	0.002	0.005			0.102
vi LDDT VMIX	0.00	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.284	0.344	0.209	0.257	0.284	1.378	0.588	0.925	0.613	0.727	0.167	0.361	3.382	4.760	
EM.FAC G/ML	0	1.84	1.63	1.64	1.63	1.83		2.6	2.07	1.62	1.64	1.6	1.62			
EMISS TPSD	0.000	0.001	0.001	0.000	0.000	0.001		0.002	0.002	0.001	0.001	0.000	0.001			0.010
vii HDDV VMIX	0.00	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	11.11	8.99	3.44	3.08	3.41	30.025	110.02	28.17	14.04	12.22	3.49	7.51	175.456	205.481	
EM.FAC G/ML	0	19.23	16.99	17.13	16.99	19.08		27.13	21.65	16.88	17.13	16.68	16.94			
EMISS TPSD	0.000	0.236	0.168	0.065	0.058	0.072		3.290	0.672	0.261	0.231	0.064	0.140			5.257
iix MC VMIX	0.00	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	1.62	2.15	0.93	1.28	1.42	7.406	5.04	2.06	4.09	2.27	3.35	7.21	24.023	31.429	
EM.FAC G/ML	0.00	1.06	1.00	1.01	1.00	0.76		1.47	1.23	0.99	1.01	0.95	0.90			
EMISS TPSD	0.000	0.002	0.002	0.001	0.001	0.001		0.008	0.003	0.004	0.003	0.004	0.007			0.037
														COUNTY TOTAL	5053.248	15.996

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX BRISTOL COUNTY

m5NXBRIS6a
10/14/93

COUNTIES	INTER- STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	2900	1487	1780	1430	969	1467	10033	0	207	70	221	40	84	622	10655	
Summer*1.0188	2954.520	1514.956	1813.464	1456.884	987.217	1494.580	10221.620	0.000	210.89	71.316	225.155	40.752	85.579	633.694	10855.314	
SPEED	59	50	42	32	33	31		NA	58	40	39	34	36			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	2363.616	1292.560	1549.061	1225.822	834.495	1263.368	8528.922	0.000	175.145	59.656	167.673	31.355	65.845	499.673	9028.595	
EM.FAC G/ML	2.52	1.85	1.67	1.63	1.66	1.62		0	2.44	1.66	1.66	1.64	1.65			
EMISS TPSD	6.566	2.636	2.852	2.202	1.527	2.256		0.000	0.471	0.109	0.307	0.057	0.120			19.102
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	209.771	88.625	113.160	110.140	75.226	113.887	710.809	0.000	15.100	5.299	28.550,	3.908	8.207	61.063	771.873	
EM.FAC G/ML	2.98	2.21	2.01	1.93	1.94	1.92		0	2.89	2	1.99	1.95	1.97			
EMISS TPSD	0.689	0.216	0.251	0.234	0.161	0.241		0.000	0.048	0.012	0.063	0.008	0.018			1.941
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	106.658	45.146	57.668	56.090	38.304	57.990	361.856	0.000	7.698	2.696	14.545	1.993	4.185	31.116	392.972	
EM.FAC G/ML	3.2	2.36	2.13	2.05	2.06	2.04		0	3.11	2.12	2.11	2.07	2.09			
EMISS TPSD	0.376	0.117	0.135	0.127	0.087	0.130	0.000	0.000	0.026	0.006	0.034	0.005	0.010			1.054
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	53.181	22.118	23.756	19.231	9.872	14.946	143.105	0.000	4.133	0.884	4.526	1.019	2.139	12.702	155.807	
EM.FAC G/ML	7.49	7.05	6.66	6.17	6.22	6.12		0	7.44	6.56	6.51	6.27	6.36			
EMISS TPSD	0.439	0.172	0.174	0.131	0.068	0.101		0.000	0.034	0.006	0.032	0.007	0.015			1.179
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	32.500	17.876	21.399	16.900	11.550	17.487	117.712	0.000	2.425	0.820	2.319	0.432	0.907	6.904	124.616	
EM.FAC G/ML	2.17	1.66	1.45	1.38	1.38	1.39		0	2.09	1.42	1.41	1.38	1.39			
EMISS TPSD	0.078	0.033	0.034	0.026	0.018	0.027		0.000	0.006	0.001	0.004	0.001	0.001			0.227
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	2.659	1.060	1.451	1.311	0.987	1.495	8.963	0.000	0.190	0.064	0.360	0.049	0.103	0.766	9.729	
EM.FAC G/ML	2.5	1.92	1.67	1.6	1.6	1.6		0	2.42	1.64	1.63	1.59	1.6			
EMISS TPSD	0.007	0.002	0.003	0.002	0.002	0.003		0.000	0.001	0.000	0.001	0.000	0.000			0.020
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	168.41	41.51	37.90	21.56	11.85	17.93	299.162	0.00	5.78	1.47	6.06	1.02	2.14	16.462	315.625	
EM.FAC G/ML	26.16	20.08	17.48	16.71	16.68	16.76		0	25.26	17.13	16.99	16.67	16.73			
EMISS TPSD	4.856	0.919	0.730	0.397	0.218	0.331		0.000	0.161	0.028	0.113	0.019	0.039			7.812
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	17.73	6.06	9.07	5.83	4.94	7.47	51.091	0.00	0.42	0.43	1.13	0.98	2.05	5.007	56.098	
EM.FAC G/ML	1.44	1.13	1.02	0.94	0.95	0.93		0.00	1.40	1.01	1.00	0.96	0.98			
EMISS TPSD	0.028	0.008	0.010	0.006	0.005	0.008		0.000	0.001	0.000	0.001	0.001	0.002			0.070
												COUNTY TOTAL			10855.314	31.406

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            MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX DUKES COUNTY

  m5NXDUKE6a
    10/18/93     INTER-   FREEWY  PRINCIP    MINOR                          VMT      INTER PRINCIPL   MINOR    MAJOR    MINOR                  VMT       VMT     TOTAL
                  STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL      TOTAL      STATE   ARTERY   ARTERY  COLLECT  COLLECT    LOCAL      TOTAL     TOTAL EMISSIONS
   COUNTIES      URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6      U1-U6     RURAL1   RURAL2   RURAL3   RURAL4   RURAL5   RURAL6     R1-R6 ALL ROADS    . TPSD
   --------     -------  -------  -------  -------  -------  -------     ======    -------  -------  -------  -------  -------  -------    ======= ========= ========
   1  ADVMT           0        0        0        0        0        0          0          0        0      105       73       28       26        232       232
 Summer*1.0188    0.000    0.000    0.000    0.000    0.000    0.000      0.000      0.000     0.00  106.974   74.372   28.526   26.489    236.362   236.362
         SPEED       NA       NA       NA       NA       NA       NA                    NA       NA       34       39       32       27


 i   LDGV VMIX        0        0        0        0        0        0                     0        0    83.65    74.47    76.94    76.94
     SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000      0.000      0.000    0.000   89.484   55.385   21.948   20.380    187.198   187.198
     EM.FAC G/ML      0        0        0        0        0        0          0          0        0     1.64     1.66     1.63      1.6
     EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                 0.000    0.000    0.162    0.101    0.039    0.036                          0.338

 ii  LDGT1 VMIX       0        0        0        0        0        0                     0        0     7.43    12.68     9.59     9.59
     SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000      0.000      0.000    0.000    7.948    9.430    2.736    2.540     22.655    22.655
     EM.FAC G/ML      0        0        0        0        0        0                     0        0     1.95     1.99     1.93     1.88
     EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                 0.000    0.000    0.017    0.021    0.006    0.005                          0.049

 iii LDGT2 VMIX       0        0        0        0        0        0                     0        0     3.78     6.46     4.89     4.89
     SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000      0.000      0.000    0.000    4.044    4.804    1.395    1.295     11.538    11.538
     EM.FAC G/ML      0        0        0        0        0        0                     0        0     2.07     2.11     2.05        2
     EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000      0.000      0.000    0.000    0.009    0.011    0.003    0.003                          0.026

 iv  HDGV VMIX     0.00     0.00     0.00     0.00     0.00     0.00                  0.00     0.00     1.24     2.01     2.50     2.50
     SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000      0.000      0.000    0.000    1.326    1.495    0.713    0.662      4.197     4.197
     EM.FAC G/ML      0        0        0        0        0        0                     0        0     6.27     6.51     6.17     5.92
     EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                 0.000    0.000    0.009    0.011    0.005    0.004                          0.029

 v   LDDV VMIX     0.00     0.00     0.00     0.00     0.00     0.00                  0.00     0.00     1.15     1.03     1.06     1.06
     SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000      0.000      0.000    0.000    1.230    0.766    0.302    0.281      2.579     2.579
     EM.FAC G/ML      0        0        0        0        0        0                     0        0     1.38     1.41     1.38     1.43
     EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                 0.000    0.000    0.002    0.001    0.000    0.000                          0.004

 vi  LDDT VMIX     0.00     0.00     0.00     0.00     0.00     0.00                  0.00     0.00     0.09     0.16     0.12     0.12
     SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000      0.000      0.000    0.000    0.096    0.119    0.034    0.032      0.281     0.281
     EM.FAC G/ML      0        0        0        0        0        0                     0        0     1.59     1.63      1.6     1.65
     EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                 0.000    0.000    0.000    0.000    0.000    0.000                          0.001

 vii HDDV VMIX     0.00     0.00     0.00     0.00     0.00     0.00       0.00       0.00     0.00     2.06     2.69     2.50     2.50
     SUMMER VMT    0.00     0.00     0.00     0.00     0.00     0.00      0.000       0.00     0.00     2.20     2.00     0.71     0.66      5.580     5.580
     EM.FAC G/ML      0        0        0        0        0        0                     0        0    16.67    16.99    16.71    17.23
     EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                 0.000    0.000    0.040    0.037    0.013    0.013                          0.104

 iix MC VMIX       0.00     0.00     0.00     0.00     0.00     0.00                  0.00     0.00     0.60     0.50     2.40     2.40
     SUMM ADVMT    0.00     0.00     0.00     0.00     0.00     0.00      0.000       0.00     0.00     0.64     0.37     0.68     0.64      2.334     2.334
     EM.FAC G/ML   0.00     0.00     0.00     0.00     0.00     0.00                  0.00     0.00     0.96     1.00     0.94     0.87
     EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                 0.000    0.000    0.001    0.000    0.001    0.001                          0.002

                                                                                                                   COUNTY TOTAL       236.3616    0.553
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MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX ESSEX COUNTY

m5nxESSX6a
10/18/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	4020	1852	2765	1865	836	1769	13107	442	110	255	217	27	121	1172	14279	
Summer*1.0188	4095.576	1886.818	2816.982	1900.062	851.717	1802.257	13353.412	450.310	112.07	259.794	221.080	27.508	123.275	1194.034	14547.445	
SPEED	60	48	42	33	36	25		59	50	50	40	33	20			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	3276.461	1609.833	2406.266	1598.712	719.956	1523.448	11134.676	333.139	93.072	217.318	164.638	21.164	94.848	924.179	12058.855	
EM.FAC G/ML	2.59	1.7	1.67	1.63	1.65	1.59		2.52	1.85	1.85	1.67	1.63	1.55			
EMISS TPSD	9.354	3.017	4.430	2.872	1.309	2.670		0.925	0.190	0.443	0.303	0.038	0.162			25.714
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	290.786	110.379	175.780	143.645	64.901	137.332	922.822	26.028	8.024	19.303	28.033	2.638	11.822	95.848	1018.669	
EM.FAC G/ML	3.07	2.04	2.01	1.94	1.97	1.85		2.98	2.21	2.21	2	1.94	1.76			
EMISS TPSD	0.984	0.248	0.389	0.307	0.141	0.280		0.085	0.020	0.047	0.062	0.006	0.023			2.592
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	147.850	56.227	89.580	73.152	33.047	69.928	469.784	13.284	4.090	9.820	14.282	1.345	6.028	48.850	518.634	
EM.FAC G/ML	3.29	2.17	2.13	2.06	2.09	1.97		3.2	2.36	2.36	2.12	2.06	1.88			
EMISS TPSD	0.536	0.134	0.210	0.166	0.076	0.152	0.000	0.047	0.011	0.026	0.033	0.003	0.012			1.407
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	73.720	27.548	36.902	25.081	8.517	18.023	189.791	11.303	2.197	3.221	4.444	0.688	3.082	24.934	214.725	
EM.FAC G/ML	7.54	6.95	6.66	6.22	6.36	5.82		7.49	7.05	7.05	6.56	6.22	5.58			
EMISS TPSD	0.613	0.211	0.271	0.172	0.060	0.116		0.093	0.017	0.025	0.032	0.005	0.019			1.633
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	45.051	22.264	33.240	22.041	9.965	21.086	153.648	4.593	1.289	2.988	2.277	0.292	1.307	12.745	166.393	
EM.FAC G/ML	2.25	1.59	1.45	1.38	1.39	1.46		2.17	1.66	1.66	1.42	1.38	1.58			
EMISS TPSD	0.112	0.039	0.053	0.034	0.015	0.034		0.011	0.002	0.005	0.004	0.000	0.002			0.312
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	3.686	1.321	2.254	1.710	0.852	1.802	11.624	0.315	0.101	0.234	0.354	0.033	0.148	1.185	12.809	
EM.FAC G/ML	2.6	1.84	1.67	1.6	1.6	1.69		2.5	1.92	1.92	1.64	1.6	1.83			
EMISS TPSD	0.011	0.003	0.004	0.003	0.002	0.003		0.001	0.000	0.000	0.001	0.000	0.000			0.028
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	233.45	51.70	58.87	28.12	10.22	21.63	403.990	58.95	3.07	5.35	5.95	0.69	3.08	77.085	481.075	
EM.FAC G/ML	27.13	19.23	17.48	16.68	16.73	17.61		26.16	20.08	20.08	17.13	16.68	19.08			
EMISS TPSD	6.981	1.096	1.134	0.517	0.188	0.420		1.700	0.068	0.118	0.112	0.013	0.065			12.413
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	24.57	7.55	14.08	7.60	4.26	9.01	67.076	2.70	0.22	1.56	1.11	0.66	2.96	9.209	76.285	
EM.FAC G/ML	1.47	1.06	1.02	0.95	0.98	0.84		1.44	1.13	1.13	1.01	0.95	0.76			
EMISS TPSD	0.040	0.009	0.016	0.008	0.005	0.008		0.004	0.000	0.002	0.001	0.001	0.002			0.096
														COUNTY TOTAL	14547.445	44.195

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX FRANKLIN COUNTY

m5nxFRAN6a 10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	209	54	86	88	49	76	562	614	675	473	542	116	343	2763	3325	
Summer*1.0188	212.929	55.015	87.617	89.654	49.921	77.429	572.566	625.543	687.69	481.892	552.190	118.181	349.448	2814.944	3387.510	
SPEED	58	48	36	32	34	33		58	48	44	43	35	30			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	170.343	46.939	74.842	75.435	42.198	65.451	475.209	462.777	571.127	403.103	411.216	90.928	268.866	2208.016	2683.225	
EM.FAC G/ML	2.44	1.7	1.65	1.63	1.64	1.63		2.44	1.7	1.68	1.68	1.64	1.62			
EMISS TPSD	0.458	0.088	0.136	0.136	0.076	0.118		1.245	1.070	0.746	0.762	0.164	0.480			5.479
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	15.118	3.218	5.467	6.778	3.804	5.900	40.286	36.156	49.239	35.805	70.018	11.334	33.512	236.063	276.348	
EM.FAC G/ML	2.89	2.04	1.97	1.93	1.95	1.94		2.89	2.04	2.02	2.01	1.96	1.91			
EMISS TPSD	0.048	0.007	0.012	0.014	0.008	0.013		0.115	0.111	0.080	0.155	0.024	0.071			0.658
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	7.687	1.639	2.786	3.452	1.937	3.004	20.505	18.454	25.101	18.216	35.671	5.779	17.088	120.308	140.814	
EM.FAC G/ML	3.11	2.17	2.09	2.05	2.07	2.06		3.11	2.17	2.14	2.14	2.08	2.03			
EMISS TPSD	0.026	0.004	0.006	0.008	0.004	0.007	0.000	0.063	0.060	0.043	0.084	0.013	0.038			0.358
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	3.833	0.803	1.148	1.183	0.499	0.774	8.241	15.701	13.479	5.975	11.099	2.955	8.736	57.945	66.186	
EM.FAC G/ML	7.44	6.95	6.36	6.17	6.27	6.22		7.44	6.95	6.76	6.71	6.31	6.07			
EMISS TPSD	0.031	0.006	0.008	0.008	0.003	0.005		0.129	0.103	0.045	0.082	0.021	0.058			0.500
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	2.342	0.649	1.034	1.040	0.584	0.906	6.555	6.381	7.908	5.542	5.688	1.253	3.704	30.475	37.030	
EM.FAC G/ML	2.09	1.59	1.39	1.38	1.38	1.38		2.09	1.59	1.49	1.47	1.38	1.4			
EMISS TPSD	0.005	0.001	0.002	0.002	0.001	0.001		0.015	0.014	0.009	0.009	0.002	0.006			0.066
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.192	0.039	0.070	0.081	0.050	0.077	0.508	0.438	0.619	0.434	0.884	0.142	0.419	2.935	3.443	
EM.FAC G/ML	2.42	1.84	1.6	1.6	1.59	1.6		2.42	1.84	1.72	1.68	1.6	1.61			
EMISS TPSD	0.001	0.000	0.000	0.000	0.000	0.000		0.001	0.001	0.001	0.002	0.000	0.001			0.007
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	12.14	1.51	1.83	1.33	0.60	0.93	18.331	81.88	18.84	9.93	14.85	2.95	8.74	137.198	155.529	
EM.FAC G/ML	25.26	19.23	16.73	16.71	16.67	16.68		25.25	19.23	17.95	17.7	16.69	16.84			
EMISS TPSD	0.338	0.032	0.034	0.024	0.011	0.017		2.279	0.399	0.196	0.290	0.054	0.162			3.837
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.28	0.22	0.44	0.36	0.25	0.39	2.931	3.75	1.38	2.89	2.76	2.84	8.39	22.004	24.935	
EM.FAC G/ML	1.40	1.06	0.98	0.94	0.96	0.95		1.40	1.06	1.03	1.02	0.97	0.91			
EMISS TPSD	0.002	0.000	0.000	0.000	0.000	0.000		0.006	0.002	0.003	0.003	0.003	0.008			0.029
														COUNTY TOTAL	3387.51	10.935

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX HAMPDEN COUNTY

m5nxHAMD6a 10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	2159	178	2361	1517	573	1113	7901	833	0	343	354	57	173	1760	9661	
Summer*1.0188	2199.589	181.346	2405.387	1545.520	583.772	1133.924	8049.539	848.660	0.00	349.448	360.655	58.072	176.252	1793.088	9842.627	
SPEED	59	44	42	39	37	24		60	NA	42	37	36	29			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	0	83.65	74.47	76.94	76.94			
SUMM ADVMT	1759.671	154.725	2054.681	1300.400	493.463	958.506	6721.447	627.839	0.000	292.314	268.580	44.680	135.609	1369.021	8090.468	
EM.FAC G/ML	2.52	1.68	1.67	1.66	1.65	1.58		2.59	0	1.67	1.65	1.65	1.61			
EMISS TPSD	4.888	0.287	3.782	2.379	0.898	1.669		1.792	0.000	0.538	0.488	0.081	0.241			17.044
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	0	7.43	12.68	9.59	9.59			
SUMM ADVMT	156.171	10.609	150.096	116.841	44.483	86.405	564.606	49.053	0.000	25.964	45.731	5.569	16.903	143.219	707.825	
EM.FAC G/ML	2.98	2.02	2.01	1.99	1.98	1.83		3.07	0	2.01	1.98	1.97	1.9			
EMISS TPSD	0.513	0.024	0.333	0.256	0.097	0.174		0.166	0.000	0.058	0.100	0.012	0.035			1.768
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	0	3.78	6.46	4.89	4.89			
SUMM ADVMT	79.405	5.404	76.491	59.503	22.650	43.996	287.450	25.035	0.000	13.209	23.298	2.840	8.619	73.001	360.451	
EM.FAC G/ML	3.2	2.14	2.13	2.11	2.1	1.95		3.29	0	2.13	2.1	2.09	2.02			
EMISS TPSD	0.280	0.013	0.180	0.138	0.052	0.095	0.000	0.091	0.000	0.031	0.054	0.007	0.019			0.959
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	0.00	1.24	2.01	2.50	2.50			
SUMM ADVMT	39.593	2.648	31.511	20.401	5.838	11.339	111.329	21.301	0.000	4.333	7.249	1.452	4.406	38.742	150.070	
EM.FAC G/ML	7.49	6.76	6.66	6.51	6.41	5.77		7.54	0	6.66	6.41	6.36	6.02			
EMISS TPSD	0.327	0.020	0.231	0.146	0.041	0.072		0.177	0.000	0.032	0.051	0.010	0.029			1.137
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	0.00	1.15	1.03	1.06	1.06			
SUMM ADVMT	24.195	2.140	28.384	17.928	6.830	13.267	92.744	8.656	0.000	4.019	3.715	0.616	1.868	18.874	111.618	
EM.FAC G/ML	2.17	1.49	1.45	1.41	1.39	1.48		2.25	0	1.45	1.39	1.39	1.4			
EMISS TPSD	0.058	0.004	0.045	0.028	0.010	0.022		0.021	0.000	0.006	0.006	0.001	0.003			0.204
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.00	0.09	0.16	0.12	0.12			
SUMM ADVMT	1.980	0.127	1.924	1.391	0.584	1.134	7.140	0.594	0.000	0.315	0.577	0.070	0.212	1.767	8.906	
EM.FAC G/ML	2.5	1.72	1.67	1.63	1.61	1.71		2.6	0	1.67	1.61	1.6	1.62			
EMISS TPSD	0.005	0.000	0.004	0.002	0.001	0.002		0.002	0.000	0.001	0.001	0.000	0.000			0.019
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	0.00	2.06	2.69	2.50	2.50			
SUMMER VMT	125.38	4.97	50.27	22.87	7.01	13.61	224.104	111.09	0.00	7.20	9.70	1.45	4.41	133.848	357.952	
EM.FAC G/ML	26.16	17.95	17.48	16.99	16.79	17.85		27.13	0	17.48	16.79	16.73	16.94			
EMISS TPSD	3.615	0.098	0.969	0.428	0.130	0.268		3.322	0.000	0.139	0.180	0.027	0.082			9.258
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.00	0.60	0.50	2.40	2.40			
SUMM ADVMT	13.20	0.73	12.03	6.18	2.92	5.67	40.720	5.09	0.00	2.10	1.80	1.39	4.23	14.616	55.336	
EM.FAC G/ML	1.44	1.03	1.02	1.00	0.99	0.83		1.47	0.00	1.02	0.99	0.98	0.90			
EMISS TPSD	0.021	0.001	0.014	0.007	0.003	0.005		0.008	0.000	0.002	0.002	0.002	0.004			0.069
														COUNTY TOTAL	9842.6268	30.458

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX HAMPSHIRE COUNTY

m5nxHAMS6a 10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	270	117	764	556	155	294	2156	128	324	502	361	75	218	1608	3764	
Summer*1.0188	275.076	119.200	778.363	566.453	157.914	299.527	2196.533	130.406	330.09	511.438	367.787	76.410	222.098	1638.230	3834.763	
SPEED	59	46	35	32	28	20		59	46	43	33	39	37			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	220.061	101.701	664.878	476.613	133.485	253.190	1849.928	96.475	274.141	427.818	273.891	58.790	170.883	1301.996	3151.924	
EM.FAC G/ML	2.52	1.7	1.64	1.63	1.61	1.55		2.52	1.69	1.68	1.63	1.66	1.65			
EMISS TPSD	0.611	0.191	1.202	0.856	0.237	0.433		0.268	0.511	0.792	0.492	0.108	0.311			6.011
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	19.530	6.973	48.570	42.824	12.033	22.824	152.754	7.537	23.635	38.000	46.635	7.328	21.299	144.434	297.188	
EM.FAC G/ML	2.98	2.04	1.96	1.93	1.89	1.76		2.98	2.03	2.01	1.94	1.99	1.98			
EMISS TPSD	0.064	0.016	0.105	0.091	0.025	0.044		0.025	0.053	0.084	0.100	0.016	0.046			0.669
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	9.930	3.552	24.752	21.808	6.127	11.622	77.791	3.847	12.048	19.332	23.759	3.736	10.861	73.584	151.375	
EM.FAC G/ML	3.2	2.15	2.08	2.05	2.01	1.88		3.2	2.16	2.14	2.06	2.11	2.1			
EMISS TPSD	0.035	0.008	0.057	0.049	0.014	0.024	0.000	0.014	0.029	0.046	0.054	0.009	0.025			0.363
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	4.951	1.740	10.197	7.477	1.579	2.995	28.940	3.273	6.470	6.342	7.393	1.910	5.552	30.940	59.880	
EM.FAC G/ML	7.49	6.82	6.31	6.17	5.97	5.58		7.49	6.85	6.71	6.22	6.51	6.41			
EMISS TPSD	0.041	0.013	0.071	0.051	0.010	0.018		0.027	0.049	0.047	0.051	0.014	0.039			0.431
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	3.026	1.407	9.185	6.571	1.848	3.504	25.540	1.330	3.796	5.882	3.788	0.810	2.354	17.960	43.500	
EM.FAC G/ML	2.17	1.52	1.38	1.38	1.42	1.58		2.17	1.54	1.47	1.38	1.41	1.39			
EMISS TPSD	0.007	0.002	0.014	0.010	0.003	0.006		0.003	0.006	0.010	0.006	0.001	0.004			0.072
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.248	0.083	0.623	0.510	0.158	0.300	1.921	0.091	0.297	0.460	0.588	0.092	0.267	1.795	3.716	
EM.FAC G/ML	2.5	1.75	1.6	1.6	1.63	1.83		2.5	1.77	1.69	1.6	1.63	1.61			
EMISS TPSD	0.001	0.000	0.001	0.001	0.000	0.001		0.000	0.001	0.001	0.001	0.000	0.000			0.007
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	15.68	3.27	16.27	8.38	1.89	3.59	49.086	17.07	9.04	10.54	9.89	1.91	5.55	54.006	103.092	
EM.FAC G/ML	26.16	18.23	16.69	16.71	17.07	19.08		26.16	18.53	17.7	16.68	16.99	16.79			
EMISS TPSD	0.452	0.066	0.299	0.154	0.036	0.076		0.492	0.185	0.206	0.182	0.036	0.103			2.286
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.65	0.48	3.89	2.27	0.79	1.50	10.572	0.78	0.66	3.07	1.84	1.83	5.33	13.514	24.086	
EM.FAC G/ML	1.44	1.05	0.97	0.94	0.89	0.76		1.44	1.04	1.02	0.95	1.00	0.99			
EMISS TPSD	0.003	0.001	0.004	0.002	0.001	0.001		0.001	0.001	0.003	0.002	0.002	0.006			0.027
												COUNTY TOTAL			3834.7632	9.866

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX MIDDLESEX COUNTY

m5nxMDSX6a
10/18/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	8186	3352	5663	3025	2158	3869	26253	527	166	486	244	67	183	1673	27926	
Summer*1.0188	8339.897	3415.018	5769.464	3081.870	2198.57	3941.737	26746.556	536.908	169.12	495.137	248.587	68.260	186.440	1704.452	28451.009	
SPEED	60	54	44	44	25	28		60	42	43	39	33	34			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	6671.917	2913.693	4928.276	2593.085	1858.45	3331.950	22297.374	397.204	140.455	414.182	185.123	52.519	143.447	1332.930	23630.304	
EM.FAC G/ML	2.59	2.15	1.68	1.68	1.59	1.61		2.59	1.67	1.68	1.66	1.63	1.64			
EMISS TPSD	19.048	6.905	9.126	4.802	3.257	5.913		1.134	0.259	0.767	0.339	0.094	0.259			51.904
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	592.133	199.779	360.015	232.989	167.531	300.360	1852.807	31.033	12.109	36.789	31.521	6.546	17.880	135.878	1988.684	
EM.FAC G/ML	3.07	2.55	2.02	2.02	1.85	1.89		3.07	2.01	2.01	1.99	1.94	1.95			
EMISS TPSD	2.004	0.562	0.802	0.519	0.342	0.626		0.105	0.027	0.082	0.069	0.014	0.038			5.188
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	301.070	101.768	183.469	118.652	85.305	152.939	943.203	15.839	6.173	18.716	16.059	3.338	9.117	69.241	1012.444	
EM.FAC G/ML	3.29	2.73	2.14	2.14	1.97	2.01		3.29	2.13	2.14	2.11	2.06	2.07			
EMISS TPSD	1.092	0.306	0.433	0.280	0.185	0.339	0.000	0.057	0.014	0.044	0.037	0.008	0.021			2.817
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	150.118	49.859	75.580	40.681	21.986	39.417	377.641	13.476	3.315	6.140	4.997	1.706	4.661	34.295	411.936	
EM.FAC G/ML	7.54	7.25	6.76	6.76	5.82	5.97		7.54	6.66	6.71	6.51	6.22	6.27			
EMISS TPSD	1.248	0.398	0.563	0.303	0.141	0.259		0.112	0.024	0.045	0.036	0.012	0.032			3.174
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	91.739	40.297	68.080	35.750	25.723	46.118	307.707	5.476	1.945	5.694	2.560	0.724	1.976	18.376	326.083	
EM.FAC G/ML	2.25	1.85	1.49	1.49	1.46	1.42		2.25	1.45	1.47	1.41	1.38	1.38			
EMISS TPSD	0.228	0.082	0.112	0.059	0.041	0.072		0.014	0.003	0.009	0.004	0.001	0.003			0.628
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	7.506	2.391	4.616	2.774	2.199	3.942	23.426	0.376	0.152	0.446	0.398	0.082	0.224	1.677	25.103	
EM.FAC G/ML	2.6	2.13	1.72	1.72	1.69	1.63		2.6	1.67	1.69	1.63	1.6	1.59			
EMISS TPSD	0.022	0.006	0.009	0.005	0.004	0.007		0.001	0.000	0.001	0.001	0.000	0.000			0.056
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	475.37	93.57	120.58	45.61	26.38	47.30	808.823	70.28	4.63	10.20	6.69	1.71	4.66	98.169	906.992	
EM.FAC G/ML	27.13	22.27	17.95	17.95	17.61	17.07		27.13	17.48	17.7	16.99	16.68	16.67			
EMISS TPSD	14.216	2.297	2.386	0.902	0.512	0.890		2.102	0.089	0.199	0.125	0.031	0.086			23.836
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	50.04	13.66	28.85	12.33	10.99	19.71	135.576	3.22	0.34	2.97	1.24	1.64	4.47	13.886	149.462	
EM.FAC G/ML	1.47	1.26	1.03	1.03	0.84	0.89		1.47	1.02	1.02	1.00	0.95	0.95			
EMISS TPSD	0.081	0.019	0.033	0.014	0.010	0.019		0.005	0.000	0.003	0.001	0.002	0.005			0.193
														COUNTY TOTAL	28451.008	87.796

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX NANTUCKET COUNTY

m5nxNANT6a 10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6		INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	0	0	0	0	0	0	0		0	0	0	55	14	30	99	99	
Summer*1.0188	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.00	0.000	56.034	14.263	30.564	100.861	100.861	
SPEED	NA	NA	NA	NA	NA	NA			NA	NA	NA	35	40	23			
i LDGV VMIX	0	0	0	0	0	0	0	0	0	0	0	74.47	76.94	76.94			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	41.729	10.974	23.516	76.219	76.219	
EM.FAC G/ML	0	0	0	0	0	0	0		0	0	0	1.64	1.67	1.57			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000	0.000	0.075	0.020	0.041			0.136
ii LDGT1 VMIX	0	0	0	0	0	0	0	0	0	0	0	12.68	9.59	9.59			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	7.105	1.368	2.931	11.404	11.404	
EM.FAC G/ML	0	0	0	0	0	0			0	0	0	1.96	2	1.82			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000	0.000	0.015	0.003	0.006			0.024
iii LDGT2 VMIX	0	0	0	0	0	0	0	0	0	0	0	6.46	4.89	4.89			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	3.620	0.697	1.495	5.812	5.812	
EM.FAC G/ML	0	0	0	0	0	0			0	0	0	2.08	2.12	1.94			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.008	0.002	0.003			0.013
iv HDGV VMIX	0	0	0	0	0	0	0	0	0	0	0	2.01	2.50	2.50			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	1.126	0.357	0.764	2.247	2.247	
EM.FAC G/ML	0	0	0	0	0	0			0	0	0	6.31	6.56	5.73			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000	0.000	0.008	0.003	0.005			0.015
v LDDV VMIX	0	0	0	0	0	0	0	0	0	0	0	1.03	1.06	1.06			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.577	0.151	0.324	1.052	1.052	
EM.FAC G/ML	0	0	0	0	0	0			0	0	0	1.38	1.42	1.5			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000	0.000	0.001	0.000	0.001			0.002
vi LDDT VMIX	0	0	0	0	0	0	0	0	0	0	0	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.090	0.017	0.037	0.143	0.143	
EM.FAC G/ML	0	0	0	0	0	0			0	0	0	1.6	1.64	1.73			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000	0.000	0.000	0.000	0.000			0.000
vii HDDV VMIX	0	0	0	0	0	0	0	0	0	0	0	2.69	2.50	2.50			
SUMMER VMT	0.00	0.00	0.00	0.00	0.00	0.00	0.000		0.00	0.00	0.00	1.51	0.36	0.76	2.628	2.628	
EM.FAC G/ML	0	0	0	0	0	0			0	0	0	16.69	17.13	18.11			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000	0.000	0.028	0.007	0.015			0.050
iix MC VMIX	0	0	0	0	0	0	0	0	0	0	0	0.50	2.40	2.40			
SUMM ADVMT	0.00	0.00	0.00	0.00	0.00	0.00	0.000		0.00	0.00	0.00	0.28	0.34	0.73	1.356	1.356	
EM.FAC G/ML	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.97	1.01	0.81			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000			0.000	0.000	0.000	0.000	0.000	0.001			0.001
														COUNTY TOTAL		100.8612	0.242

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX NORFOLK COUNTY

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m5nxNORF6a
  10/18/93    INTER-   FREEWY  PRINCIP    MINOR                              VMT     INTER PRINCIPL   MINOR   MAJOR   MINOR                VMT        VMT     TOTAL
               STATE  EXPRESS   ARTERY   ARTERY  COLLECT     LOCAL         TOTAL     STATE   ARTERY  ARTERY COLLECT COLLECT    LOCAL     TOTAL      TOTAL EMISSIONS
  COUNTIES    URBAN1   URBAN2   URBAN3   URBAN4   URBAN5    URBAN6         U1-U6    RURAL1   RURAL2  RURAL3  RURAL4  RURAL5   RURAL6    R1-R6  ALL ROADS      TPSD
  --------   -------  -------  -------  -------  -------   -------        ======   -------  -------  ------- ------- -------  -------  ======= ========= ========
 1 ADVMT        5016     1107     3652     1967      954      1959         14655       126        0     117      50       8       29      330     14985
Summer*1.0188 5110.301 1127.812 3720.658 2003.980 971.935 1995.829     14930.514   128.369     0.00 119.200  50.940   8.150   29.545  336.204 15266.718
      SPEED       60       51       39       36       32        29                      60       NA      52      39      39       31


i   LDGV VMIX     80    85.32    85.42    84.14    84.53     84.53                  73.98    83.05   83.65   74.47   76.94    76.94
  SUMM ADVMT 4088.241 962.249 3178.186 1686.148 821.577 1687.074     12423.475    94.967    0.000  99.710  37.935   6.271   22.732  261.616 12685.091
  EM.FAC G/ML   2.59     1.93     1.66     1.65     1.63      1.61                   2.59        0       2    1.66    1.66     1.62
  EMISS TPSD  11.672    2.047    5.816    3.067    1.476     2.994                  0.271    0.000   0.220   0.069   0.011    0.041                         27.684

ii  LDGT1 VMIX   7.1     5.85     6.24     7.56     7.62      7.62                   5.78     7.16    7.43   12.68    9.59     9.59
  SUMM ADVMT 362.831   65.977  232.169  151.501   74.061   152.082      1038.622     7.420    0.000   8.857   6.459   0.782    2.833   26.350  1064.972
  EM.FAC G/ML   3.07      2.3     1.99     1.97     1.93       1.9                   3.07        0    2.38    1.99    1.99     1.92
  EMISS TPSD   1.228    0.167    0.509    0.329    0.158     0.319                  0.025    0.000   0.023   0.014   0.002    0.006                          2.780

iii LDGT2 VMIX  3.61     2.98     3.18     3.85     3.88      3.88                   2.95     3.65    3.78    6.46    4.89     4.89
  SUMM ADVMT 184.482   33.609  118.317   77.153   37.711    77.438       528.710     3.787    0.000   4.506   3.291   0.399    1.445   13.427   542.137
  EM.FAC G/ML   3.29     2.45     2.11     2.09     2.05      2.02                   3.29        0    2.55    2.11    2.11     2.04
  EMISS TPSD   0.669    0.091    0.275    0.178    0.085     0.172         0.000    0.014    0.000   0.013   0.008   0.001    0.003                          1.509

iv  HDGV VMIX   1.80     1.46     1.31     1.32     1.00      1.00                   2.51     1.96    1.24    2.01    2.50     2.50
  SUMM ADVMT  91.985   16.466   48.741   26.453    9.719    19.958       213.322     3.222    0.000   1.478   1.024   0.204    0.739    6.666   219.989
  EM.FAC G/ML   7.54      7.1     6.51     6.36     6.17      6.02                   7.54        0    7.15    6.51    6.51     6.12
  EMISS TPSD   0.765    0.129    0.350    0.185    0.066     0.132                  0.027    0.000   0.012   0.007   0.001    0.005                          1.679

v   LDDV VMIX   1.10     1.18     1.18     1.16     1.17      1.17                   1.02     1.15    1.15    1.03    1.06     1.06
  SUMM ADVMT  56.213   13.308   43.904   23.246   11.372    23.351       171.394     1.309    0.000   1.371   0.525   0.086    0.313    3.604   174.999
  EM.FAC G/ML   2.25      1.7     1.41     1.39     1.38       1.4                   2.25        0    1.75    1.41    1.41     1.39
  EMISS TPSD   0.139    0.025    0.068    0.036    0.017     0.036                  0.003    0.000   0.003   0.001   0.000    0.000                          0.329

vi  LDDT VMIX   0.09     0.07     0.08     0.09     0.10      0.10                   0.07     0.09    0.09    0.16    0.12     0.12
  SUMM ADVMT   4.599    0.789    2.977    1.804    0.972     1.996        13.137     0.090    0.000   0.107   0.082   0.010    0.035    0.324    13.460
  EM.FAC G/ML    2.6     1.97     1.63      1.6      1.6      1.62                    2.6        0    2.02    1.63    1.63      1.6
  EMISS TPSD   0.013    0.002    0.005    0.003    0.002     0.004                  0.000    0.000   0.000   0.000   0.000    0.000                          0.029

vii HDDV VMIX   5.70     2.74     2.09     1.48     1.20      1.20                  13.09     2.74    2.06    2.69    2.50     2.50
  SUMMER VMT  291.29    30.90    77.76    29.66    11.66     23.95       465.223     16.80     0.00    2.46    1.37    0.20     0.74   21.572   486.795
  EM.FAC G/ML  27.13    20.56    16.99    16.73    16.71     16.94                  27.13        0   21.09   16.99   16.99    16.76
  EMISS TPSD   8.711    0.700    1.456    0.547    0.215     0.447                  0.503    0.000   0.057   0.026   0.004    0.014                         12.679

iix MC VMIX     0.60     0.40     0.50     0.40     0.50      0.50                   0.60     0.20    0.60    0.50    2.40     2.40
  SUMM ADVMT   30.66     4.51    18.60     8.02     4.86      9.98        76.631      0.77     0.00    0.72    0.25    0.20     0.71    2.645    79.276
  EM.FAC G/ML   1.47     1.16     1.00     0.98     0.94      0.90                   1.47     0.00    1.19    1.00    1.00     0.93
  EMISS TPSD   0.050    0.006    0.021    0.009    0.005     0.010                  0.001    0.000   0.001   0.000   0.000    0.001                          0.103

                                                                                                                  COUNTY TOTAL        15266.718    46.792
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MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX PLYMOUTH COUNTY

m5nxPLYM6a
10/18/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS VOC TPSD
1 ADVMT	241	704	2222	1269	616	945	5997	811	628	309	410	148	329	2635	8632	
Summer*1.0188	245.531	717.235	2263.774	1292.857	627.581	962.766	6109.744	826.247	639.81	314.809	417.708	150.782	335.185	2684.538	8794.282	
SPEED	60	60	44	40	29	28		60	58	51	48	31	27			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	196.425	611.945	1933.715	1087.810	530.494	813.826	5174.215	611.257	531.359	263.338	311.067	116.012	257.891	2090.925	7265.140	
EM.FAC G/ML	2.59	2.59	1.68	1.67	1.61	1.61		2.59	2.44	1.93	1.7	1.62	1.6			
EMISS TPSD	0.561	1.747	3.581	2.002	0.941	1.444		1.745	1.429	0.560	0.583	0.207	0.455			15.257
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	17.433	41.958	141.259	97.740	47.822	73.363	419.575	47.757	45.810	23.390	52.965	14.460	32.144	216.527	636.102	
EM.FAC G/ML	3.07	3.07	2.02	2	1.9	1.89		3.07	2.89	2.3	2.04	1.92	1.88			
EMISS TPSD	0.059	0.142	0.315	0.215	0.100	0.153		0.162	0.146	0.059	0.119	0.031	0.067			1.567
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	8.864	21.374	71.988	49.775	24.350	37.355	213.706	24.374	23.353	11.900	26.984	7.373	16.391	110.375	324.080	
EM.FAC G/ML	3.29	3.29	2.14	2.12	2.02	2.01		3.29	3.11	2.45	2.17	2.04	2			
EMISS TPSD	0.032	0.078	0.170	0.116	0.054	0.083	0.000	0.088	0.080	0.032	0.065	0.017	0.036			0.851
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	4.420	10.472	29.655	17.066	6.276	9.628	77.516	20.739	12.540	3.904	8.396	3.770	8.380	57.728	135.244	
EM.FAC G/ML	7.54	7.54	6.76	6.56	6.02	5.97		7.54	7.44	7.1	6.95	6.12	5.92			
EMISS TPSD	0.037	0.087	0.221	0.123	0.042	0.063		0.172	0.103	0.031	0.064	0.025	0.055			1.023
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	2.701	8.463	26.713	14.997	7.343	11.264	71.481	8.428	7.358	3.620	4.302	1.598	3.553	28.859	100.340	
EM.FAC G/ML	2.25	2.25	1.49	1.42	1.4	1.42		2.25	2.09	1.7	1.59	1.39	1.43			
EMISS TPSD	0.007	0.021	0.044	0.023	0.011	0.018		0.021	0.017	0.007	0.008	0.002	0.006			0.184
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.221	0.502	1.811	1.164	0.628	0.963	5.288	0.578	0.576	0.283	0.668	0.181	0.402	2.689	7.977	
EM.FAC G/ML	2.6	2.6	1.72	1.64	1.62	1.63		2.6	2.42	1.97	1.84	1.6	1.65			
EMISS TPSD	0.001	0.001	0.003	0.002	0.001	0.002		0.002	0.002	0.001	0.001	0.000	0.001			0.017
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	14.00	19.65	47.31	19.13	7.53	11.55	119.179	108.16	17.53	6.49	11.24	3.77	8.38	155.557	274.736	
EM.FAC G/ML	27.13	27.13	17.95	17.13	16.94	17.07		27.13	25.26	20.56	19.23	16.76	17.23			
EMISS TPSD	0.419	0.588	0.936	0.361	0.141	0.217		3.234	0.488	0.147	0.238	0.070	0.159			6.998
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.47	2.87	11.32	5.17	3.14	4.81	28.784	4.96	1.28	1.89	2.09	3.62	8.04	21.878	50.662	
EM.FAC G/ML	1.47	1.47	1.03	1.01	0.90	0.89		1.47	1.40	1.16	1.06	0.93	0.87			
EMISS TPSD	0.002	0.005	0.013	0.006	0.003	0.005		0.008	0.002	0.002	0.002	0.004	0.008			0.060
														COUNTY TOTAL	8794.2816	25.957

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX SUFFOLK COUNTY

m5nxSUFF6a 10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	1531	1414	1957	858	280	827	6867	NA	NA	NA	NA	NA	NA	0	6867	
Summer*1.0188	1559.783	1440.583	1993.792	874.130	285.264	842.548	6996.100	0.000	0.00	0.000	0.000	0.000	0.000	0.000	6996.100	
SPEED	57	43	34	30	31	29		NA	NA	NA	NA	NA	NA			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		0	0	0	0	0	0			
SUMM ADVMT	1247.826	1229.106	1703.097	735.493	241.134	712.205	5868.861	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5868.861	
EM.FAC G/ML	2.37	1.68	1.64	1.62	1.62	1.61										
EMISS TPSD	3.260	2.276	3.079	1.313	0.431	1.264		0.000	0.000	0.000	0.000	0.000	0.000			11.623
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		0	0	0	0	0	0			
SUMM ADVMT	110.745	84.274	124.413	66.084	21.737	64.202	471.455	0.000	0.000	0.000	0.000	0.000	0.000	0.000	471.455	
EM.FAC G/ML	2.81	2.01	1.95	1.91	1.92	1.9										
EMISS TPSD	0.343	0.187	0.267	0.139	0.046	0.134		0.000	0.000	0.000	0.000	0.000	0.000			1.117
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		0	0	0	0	0	0			
SUMM ADVMT	56.308	42.929	63.403	33.654	11.068	32.691	240.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	240.053	
EM.FAC G/ML	3.01	2.14	2.07	2.03	2.04	2.02										
EMISS TPSD	0.187	0.101	0.145	0.075	0.025	0.073	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.606
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		0	0	0	0	0	0			
SUMM ADVMT	28.076	21.033	26.119	11.539	2.853	8.425	98.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.044	
EM.FAC G/ML	7.39	6.71	6.27	6.07	6.12	6.02										
EMISS TPSD	0.229	0.156	0.181	0.077	0.019	0.056		0.000	0.000	0.000	0.000	0.000	0.000			0.717
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		0	0	0	0	0	0			
SUMM ADVMT	17.158	16.999	23.527	10.140	3.338	9.858	81.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	81.019	
EM.FAC G/ML	2.02	1.47	1.38	1.4	1.39	1.4										
EMISS TPSD	0.038	0.028	0.036	0.016	0.005	0.015		0.000	0.000	0.000	0.000	0.000	0.000			0.138
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0	0	0	0	0	0			
SUMM ADVMT	1.404	1.008	1.595	0.787	0.285	0.843	5.922	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.922	
EM.FAC G/ML	2.34	1.69	1.59	1.61	1.6	1.62										
EMISS TPSD	0.004	0.002	0.003	0.001	0.001	0.002		0.000	0.000	0.000	0.000	0.000	0.000			0.012
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		0	0	0	0	0	0			
SUMMER VMT	88.91	39.47	41.67	12.94	3.42	10.11	196.521	0.00	0.00	0.00	0.00	0.00	0.00	0.000	196.521	
EM.FAC G/ML	24.42	17.7	16.67	16.84	16.76	16.94										
EMISS TPSD	2.393	0.770	0.766	0.240	0.063	0.189		0.000	0.000	0.000	0.000	0.000	0.000			4.421
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0	0	0	0	0	0			
SUMM ADVMT	9.36	5.76	9.97	3.50	1.43	4.21	34.226	0.00	0.00	0.00	0.00	0.00	0.00	0.000	34.226	
EM.FAC G/ML	1.37	1.02	0.96	0.91	0.93	0.90										
EMISS TPSD	0.014	0.006	0.011	0.004	0.001	0.004		0.000	0.000	0.000	0.000	0.000	0.000			0.040
													COUNTY TOTAL		6996.0996	18.673

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -NOX WORCESTER COUNTY

m5nxWORC6a 10/18/93 COUNTIES	INTER- STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
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1 BARN ADVMT	3886	1314	3473	1460	738	1208	12079	1465	453	1520	981	205	562	5186	17265	
Summer*1.0188	3959.057	1338.703	3538.292	1487.448	751.874	1230.710	12306.085	1492.54	461.52	1548.58	999.443	208.854	572.566	5283.497	17589.582	
SPEED	54	57	45	39	40	28		59	43	53	40	35	25			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	3167.245	1142.182	3022.409	1251.539	635.559	1040.320	10259.254	1104.18	383.29	1295.38	744.285	160.692	440.532	4128.365	14387.619	
EM.FAC G/ML	2.15	2.37	1.69	1.66	1.66	1.61		2.52	1.68	2.07	1.67	1.64	1.59			
EMISS TPSD	7.506	2.984	5.630	2.290	1.163	1.846		3.067	0.710	2.956	1.370	0.290	0.772			30.585
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	281.093	78.314	220.789	112.451	57.293	93.780	843.721	86.269	33.045	115.059	126.729	20.029	54.909	436.040	1279.761	
EM.FAC G/ML	2.55	2.81	2.03	1.99	1.99	1.89		2.98	2.01	2.47	2	1.96	1.85			
EMISS TPSD	0.790	0.243	0.494	0.247	0.126	0.195		0.283	0.073	0.313	0.279	0.043	0.112			3.199
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	142.922	39.893	112.518	57.267	29.173	47.752	429.524	44.030	16.845	58.536	64.564	10.213	27.998	222.187	651.711	
EM.FAC G/ML	2.73	3.01	2.15	2.11	2.11	2.01		3.2	2.14	2.64	2.12	2.08	1.97			
EMISS TPSD	0.430	0.132	0.267	0.133	0.068	0.106	0.000	0.155	0.040	0.170	0.151	0.023	0.061			1.736
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	71.263	19.545	46.352	19.634	7.519	12.307	176.620	37.463	9.046	19.202	20.089	5.221	14.314	105.335	281.955	
EM.FAC G/ML	7.25	7.39	6.81	6.51	6.51	5.97		7.49	6.71	7.2	6.56	6.31	5.82			
EMISS TPSD	0.570	0.159	0.348	0.141	0.054	0.081		0.309	0.067	0.152	0.145	0.036	0.092			2.155
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	43.550	15.797	41.752	17.254	8.797	14.399	141.549	15.224	5.307	17.809	10.294	2.214	6.069	56.917	198.466	
EM.FAC G/ML	1.85	2.02	1.51	1.41	1.41	1.42		2.17	1.47	1.8	1.42	1.38	1.46			
EMISS TPSD	0.089	0.035	0.069	0.027	0.014	0.023		0.036	0.009	0.035	0.016	0.003	0.010			0.366
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	3.563	0.937	2.831	1.339	0.752	1.231	10.652	1.045	0.415	1.394	1.599	0.251	0.687	5.391	16.043	
EM.FAC G/ML	2.13	2.34	1.74	1.63	1.63	1.63		2.5	1.69	2.07	1.64	1.6	1.69			
EMISS TPSD	0.008	0.002	0.005	0.002	0.001	0.002		0.003	0.001	0.003	0.003	0.000	0.001			0.034
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	225.67	36.68	73.95	22.01	9.02	14.77	382.102	195.37	12.65	31.90	26.89	5.22	14.31	286.340	668.443	
EM.FAC G/ML	22.27	24.42	18.22	16.99	16.99	17.07		26.16	17.7	21.65	17.13	16.69	17.61			
EMISS TPSD	5.540	0.987	1.485	0.412	0.169	0.278		5.634	0.247	0.761	0.508	0.096	0.278			16.395
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	23.75	5.35	17.69	5.95	3.76	6.15	62.663	8.96	0.92	9.29	5.00	5.01	13.74	42.921	105.584	
EM.FAC G/ML	1.26	1.37	1.04	1.00	1.00	0.89		1.44	1.02	1.23	1.01	0.97	0.84			
EMISS TPSD	0.033	0.008	0.020	0.007	0.004	0.006		0.014	0.001	0.013	0.006	0.005	0.013			0.130
														COUNTY TOTAL	17589.582	54.599

5coSmobct
Oct 19 93

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -CO
TONS PER SUMMER DAY

COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
1 BARNSTABLE	52.808	5.929	3.314	3.289	0.046	0.005	0.650	0.575	66.616
2 BERKSHIRE	66.674	7.293	4.062	4.678	0.055	0.005	1.530	0.585	84.882
3 BRISTOL	154.047	15.901	8.852	8.083	0.120	0.011	2.324	1.032	190.370
4 DUKES	2.974	0.409	0.229	0.216	0.003	0.000	0.045	0.043	3.919
5 ESSEX	217.735	22.456	12.494	11.553	0.165	0.015	3.610	1.557	269.585
6 FRANKLIN	41.778	5.035	2.798	3.306	0.034	0.004	1.116	0.434	54.505
7 HAMPDEN	141.965	14.856	8.281	7.916	0.109	0.010	2.671	1.062	176.870
8 HAMPSHIRE	52.167	5.703	3.190	3.062	0.045	0.004	0.792	0.419	65.382
9 MIDDLESEX	423.184	43.615	24.251	22.076	0.320	0.028	6.774	2.968	523.216
10 NANTUCKET	1.305	0.219	0.123	0.129	0.001	0.000	0.023	0.029	1.829
11 NORFOLK	232.533	23.883	13.302	11.716	0.170	0.015	3.645	1.611	286.875
12 PLYMOUTH	125.418	12.958	7.214	7.121	0.097	0.009	2.054	0.956	155.827
13 SUFFOLK	95.330	9.039	5.006	5.061	0.081	0.007	1.469	0.595	116.588
14 WORCESTER	215.623	22.679	12.583	14.244	0.183	0.017	4.770	1.699	271.798
STATE	1823.541	189.975	105.699	102.450	1.429	0.130	31.473	13.565	2268.262

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO BARNSTABLE COUNTY

m5coBARN 10/14/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
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1 BARN ADVMT	0	243	547	286	301	572	1949	0	460	536	377	98	440	1911	3860	
Summer*1.0188	0.000	247.568	557.284	291.377	306.659	582.754	1985.641	0.000	468.65	546.077	384.088	99.842	448.272	1946.927	3932.568	
SPEED	NA	60	40	35	37	27		NA	50	42	40	37	23			
i LDGV VMIX	0	85.32	85.42	84.14	84.53	84.53		0	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	211.225	476.032	245.164	259.219	492.602	1684.242	0.000	389.212	456.793	286.030	76.819	344.900	1553.755	3237.996	
EM.FAC G/ML	0	22.17	12.95	14.14	13.62	17.04		0	11.69	12.58	12.95	13.62	19.2			
EMISS TPSD	0.000	5.162	6.795	3.821	3.892	9.253		0.000	5.015	6.334	4.083	1.153	7.300			52.808
ii LDGT1 VMIX	0	5.85	6.24	7.56	7.62	7.62		0	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	14.483	34.774	22.028	23.367	44.406	139.059	0.000	33.555	40.574	48.702	9.575	42.989	175.395	314.454	
EM.FAC G/ML	0	28.23	15.02	16.2	15.67	19.27		0	13.97	14.68	15.02	15.67	21.46			
EMISS TPSD	0.000	0.451	0.576	0.393	0.404	0.943		0.000	0.517	0.657	0.806	0.165	1.017			5.929
iii LDGT2 VMIX	0	2.98	3.18	3.85	3.88	3.88		0	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	7.378	17.722	11.218	11.898	22.611	70.826	0.000	17.106	20.642	24.812	4.882	21.921	89.362	160.189	
EM.FAC G/ML	0	30.8	16.45	17.83	17.22	21.26		0	15.07	16.02	16.45	17.22	23.78			
EMISS TPSD	0.000	0.250	0.321	0.220	0.226	0.530	0.000	0.000	0.284	0.365	0.450	0.093	0.575			3.314
iv HDGV VMIX	0.00	1.46	1.31	1.32	1.00	1.00		0.00	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	3.614	7.300	3.846	3.067	5.828	23.655	0.000	9.186	6.771	7.720	2.496	11.207	37.380	61.035	
EM.FAC G/ML	0	52.86	41.58	44.93	43.28	57.03		0	42	40.94	41.58	43.28	67.73			
EMISS TPSD	0.000	0.211	0.335	0.190	0.146	0.366		0.000	0.425	0.306	0.354	0.119	0.837			3.289
v LDDV VMIX	0.00	1.18	1.18	1.16	1.17	1.17		0.00	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	2.921	6.576	3.380	3.588	6.818	23.283	0.000	5.389	6.280	3.956	1.058	4.752	21.435	44.719	
EM.FAC G/ML	0	0.86	0.81	0.9	0.86	1.16		0	0.77	0.79	0.81	0.86	1.37			
EMISS TPSD	0.000	0.003	0.006	0.003	0.003	0.009		0.000	0.005	0.005	0.004	0.001	0.007			0.046
vi LDDT VMIX	0.00	0.07	0.08	0.09	0.10	0.10		0.00	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.173	0.446	0.262	0.307	0.583	1.771	0.000	0.422	0.491	0.615	0.120	0.538	2.186	3.956	
EM.FAC G/ML	0	0.98	0.93	1.02	0.98	1.32		0	0.87	0.9	0.93	0.98	1.56			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.001		0.000	0.000	0.000	0.001	0.000	0.001			0.005
vii HDDV VMIX	0.00	2.74	2.09	1.48	1.20	1.20		0.00	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	6.78	11.65	4.31	3.68	6.99	33.416	0.00	12.84	11.25	10.33	2.50	11.21	48.125	81.541	
EM.FAC G/ML	0	6.78	6.39	7.05	6.74	9.08		0	6.01	6.22	6.39	6.74	10.76			
EMISS TPSD	0.000	0.051	0.082	0.034	0.027	0.070		0.000	0.085	0.077	0.073	0.019	0.133			0.650
iix MC VMIX	0.00	0.40	0.50	0.40	0.50	0.50		0.00	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	0.99	2.79	1.17	1.53	2.91	9.389	0.00	0.94	3.28	1.92	2.40	10.76	19.289	28.678	
EM.FAC G/ML	0.00	24.17	12.83	14.90	13.97	20.11		0.00	10.97	12.23	12.83	13.97	23.82			
EMISS TPSD	0.000	0.026	0.039	0.019	0.024	0.065		0.000	0.011	0.044	0.027	0.037	0.282			0.575
													COUNTY TOTAL		3932.568	66.615

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO BERKSHIRE COUNTY

m5coBERK6a
10/18/93

COUNTIES	INTER- STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	0	398	422	228	252	279	1579	825	1009	669	446	137	295	3381	4960	
Summer*1.0188	0.000	405.482	429.934	232.286	256.738	284.245	1608.685	840.510	1027.97	681.577	454.385	139.576	300.546	3444.563	5053.248	
SPEED	NA	48	39	40	39	20		60	53	38	40	33	29			
i LDGV VMIX	0	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	0.000	345.958	367.249	195.446	217.020	240.272	1365.945	621.809	853.728	570.139	338.380	107.389	231.240	2722.687	4088.632	
EM.FAC G/ML	0	11.69	13.16	12.95	13.16	21.33		22.17	11.69	13.38	12.95	14.73	16.17			
EMISS TPSD	0.000	4.458	5.327	2.790	3.148	5.649		15.196	11.001	8.409	4.830	1.744	4.122			66.674
ii LDGT1 VMIX	0	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	0.000	23.721	26.828	17.561	19.563	21.659	109.332	48.581	73.603	50.641	57.616	13.385	28.822	272.649	381.981	
EM.FAC G/ML	0	13.97	15.22	15.02	15.22	23.53		28.33	13.97	15.43	15.02	16.83	18.35			
EMISS TPSD	0.000	0.365	0.450	0.291	0.328	0.562		1.517	1.133	0.861	0.954	0.248	0.583			7.293
iii LDGT2 VMIX	0	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	0.000	12.083	13.672	8.943	9.961	11.029	55.688	24.795	37.521	25.764	29.353	6.825	14.697	138.955	194.643	
EM.FAC G/ML	0	15.07	16.69	16.45	16.69	26.26		30.8	15.07	16.94	16.45	18.53	20.23			
EMISS TPSD	0.000	0.201	0.252	0.162	0.183	0.319	0.000	0.842	0.623	0.481	0.532	0.139	0.328			4.062
iv HDGV VMIX	0.00	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	0.000	5.920	5.632	3.066	2.567	2.842	20.028	21.097	20.148	8.452	9.133	3.489	7.514	69.833	89.861	
EM.FAC G/ML	0	41.19	42.05	41.58	42.05	78.86		52.86	43.97	42.61	41.58	47.07	53.03			
EMISS TPSD	0.000	0.269	0.261	0.141	0.119	0.247		1.229	0.977	0.397	0.419	0.181	0.439			4.678
v LDDV VMIX	0.00	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	0.000	4.785	5.073	2.695	3.004	3.326	18.882	8.573	11.822	7.838	4.680	1.480	3.186	37.578	56.460	
EM.FAC G/ML	0	0.76	0.83	0.81	0.83	1.59		0.86	0.78	0.84	0.81	0.95	1.07			
EMISS TPSD	0.000	0.004	0.005	0.002	0.003	0.006		0.008	0.010	0.007	0.004	0.002	0.004			0.055
vi LDDT VMIX	0.00	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.284	0.344	0.209	0.257	0.284	1.378	0.588	0.925	0.613	0.727	0.167	0.361	3.382	4.760	
EM.FAC G/ML	0	0.87	0.94	0.93	0.94	1.81		0.98	0.89	0.96	0.93	1.08	1.22			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.001		0.001	0.001	0.001	0.001	0.000	0.000			0.005
vii HDDV VMIX	0.00	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	0.00	11.11	8.99	3.44	3.08	3.41	30.025	110.02	28.17	14.04	12.22	3.49	7.51	175.456	205.481	
EM.FAC G/ML	0	5.99	6.49	6.39	6.49	12.46		6.78	6.11	6.61	6.39	7.43	8.43			
EMISS TPSD	0.000	0.073	0.064	0.024	0.022	0.047		0.822	0.190	0.102	0.086	0.029	0.070			1.530
iix MC VMIX	0.00	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	0.00	1.62	2.15	0.93	1.28	1.42	7.406	5.04	2.06	4.09	2.27	3.35	7.21	24.023	31.429	
EM.FAC G/ML	0.00	10.97	13.18	12.83	13.18	27.41		24.17	10.97	13.56	12.83	15.97	18.57			
EMISS TPSD	0.000	0.020	0.031	0.013	0.019	0.043		0.134	0.025	0.061	0.032	0.059	0.148			0.585
													COUNTY TOTAL		5053.248	84.882

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO BRISTOL COUNTY

m5coBRIS6a
10/18/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	2900	1487	1780	1430	969	1467	10033	0	207	70	221	40	84	622	10655	
Summer*1.0188	2954.520	1514.956	1813.464	1456.884	987.217	1494.580	10221.620	0.000	210.89	71.316	225.155	40.752	85.579	633.694	10855.314	
SPEED	59	50	42	32	33	31		NA	58	40	39	34	36			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	2363.616	1292.560	1549.061	1225.822	834.495	1263.368	8528.922	0.000	175.145	59.656	167.673	31.355	65.845	499.673	9028.595	
EM.FAC G/ML	20.07	11.69	12.58	15.06	14.73	15.41		0	17.98	12.95	13.16	14.43	13.87			
EMISS TPSD	52.291	16.656	21.481	20.349	13.550	21.460		0.000	3.471	0.852	2.432	0.499	1.007			154.047
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	209.771	88.625	113.160	110.140	75.226	113.887	710.809	0.000	15.100	5.299	28.550	3.908	8.207	61.063	771.873	
EM.FAC G/ML	25.37	13.97	14.68	17.17	16.83	17.54		0	22.52	15.02	15.22	16.5	15.93			
EMISS TPSD	5.866	1.365	1.831	2.085	1.396	2.202		0.000	0.375	0.088	0.479	0.071	0.144			15.901
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	106.658	45.146	57.668	56.090	38.304	57.990	361.856	0.000	7.698	2.696	14.545	1.993	4.185	31.116	392.972	
EM.FAC G/ML	27.66	15.07	16.02	18.91	18.53	19.32		0	24.51	16.45	16.69	18.17	17.51			
EMISS TPSD	3.252	0.750	1.018	1.169	0.782	1.235	0.000	0.000	0.208	0.049	0.268	0.040	0.081			8.852
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	53.181	22.118	23.756	19.231	9.872	14.946	143.105	0.000	4.133	0.884	4.526	1.019	2.139	12.702	155.807	
EM.FAC G/ML	51.15	42	40.94	48.33	47.07	49.74		0	49.61	41.58	42.05	45.94	44.05			
EMISS TPSD	2.999	1.024	1.072	1.025	0.512	0.819		0.000	0.226	0.041	0.210	0.052	0.104			8.083
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	32.500	17.876	21.399	16.900	11.550	17.487	117.712	0.000	2.425	0.820	2.319	0.432	0.907	6.904	124.616	
EM.FAC G/ML	0.85	0.77	0.79	0.97	0.95	1		0	0.83	0.81	0.83	0.92	0.88			
EMISS TPSD	0.030	0.015	0.019	0.018	0.012	0.019		0.000	0.002	0.001	0.002	0.000	0.001			0.120
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	2.659	1.060	1.451	1.311	0.987	1.495	8.963	0.000	0.190	0.064	0.360	0.049	0.103	0.766	9.729	
EM.FAC G/ML	0.96	0.87	0.9	1.11	1.08	1.14		0	0.95	0.93	0.94	1.05	1			
EMISS TPSD	0.003	0.001	0.001	0.002	0.001	0.002		0.000	0.000	0.000	0.000	0.000	0.000			0.011
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	168.41	41.51	37.90	21.56	11.85	17.93	299.162	0.00	5.78	1.47	6.06	1.02	2.14	16.462	315.625	
vi EM.FAC G/ML	6.65	6.01	6.22	7.65	7.43	7.88		0	6.52	6.39	6.49	7.23	6.89			
EMISS TPSD	1.234	0.275	0.260	0.182	0.097	0.156		0.000	0.042	0.010	0.043	0.008	0.016			2.324
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	17.73	6.06	9.07	5.83	4.94	7.47	51.091	0.00	0.42	0.43	1.13	0.98	2.05	5.007	56.098	
EM.FAC G/ML	21.53	10.97	12.23	16.56	15.97	17.19		0.00	18.89	12.83	13.18	15.42	14.42			
EMISS TPSD	0.421	0.073	0.122	0.106	0.087	0.142		0.000	0.009	0.006	0.016	0.017	0.033			1.032
													COUNTY TOTAL		10855.314	190.368

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                MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO DUKES COUNTY

m5coDUKE6a
  10/18/93       INTER-   FREEWY  PRINCIP   MINOR                        VMT     INTER PRINCIPL  MINOR   MAJOR   MINOR                VMT       VMT    TOTAL
                  STATE  EXPRESS   ARTERY  ARTERY  COLLECT   LOCAL     TOTAL     STATE   ARTERY  ARTERY COLLECT COLLECT   LOCAL     TOTAL     TOTAL EMISSIONS
  COUNTIES       URBAN1   URBAN2   URBAN3  URBAN4   URBAN5  URBAN6     U1-U6    RURAL1   RURAL2  RURAL3  RURAL4  RURAL5  RURAL6     R1-R6 ALL ROADS     TPSD
  --------      -------  -------  -------  ------- ------- -------    ======   -------  ------- ------- ------- ------- -------   ======= ========= ========
 1 ADVMT              0        0        0        0       0       0         0         0        0     105      73      28      26       232       232
Summer*1.0188     0.000    0.000    0.000    0.000   0.000   0.000     0.000     0.000     0.00 106.974  74.372  28.526  26.489   236.362   236.362
       SPEED         NA       NA       NA       NA      NA      NA                  NA       NA      34      39      32      27


i  LDGV VMIX          0        0        0        0       0       0                   0        0   83.65   74.47   76.94   76.94
  SUMM ADVMT      0.000    0.000    0.000    0.000   0.000   0.000     0.000     0.000    0.000  89.484  55.385  21.948  20.380   187.198   187.198
  EM.FAC G/ML         0        0        0        0       0       0         0         0        0   14.43   13.16   15.06   17.04
  EMISS TPSD      0.000    0.000    0.000    0.000   0.000   0.000               0.000    0.000   1.423   0.803   0.364   0.383                         2.974

ii  LDGT1 VMIX        0        0        0        0       0       0                   0        0    7.43   12.68    9.59    9.59
  SUMM ADVMT      0.000    0.000    0.000    0.000   0.000   0.000     0.000     0.000    0.000   7.948   9.430   2.736   2.540    22.655    22.655
  EM.FAC G/ML         0        0        0        0       0       0                   0        0    16.5   15.22   17.17   19.27
  EMISS TPSD      0.000    0.000    0.000    0.000   0.000   0.000               0.000    0.000   0.145   0.158   0.052   0.054                         0.409

iii LDGT2 VMIX        0        0        0        0       0       0                   0        0    3.78    6.46    4.89    4.89
  SUMM ADVMT      0.000    0.000    0.000    0.000   0.000   0.000     0.000     0.000    0.000   4.044   4.804   1.395   1.295    11.538    11.538
  EM.FAC G/ML         0        0        0        0       0       0                   0        0   18.17   16.69   18.91   21.26
  EMISS TPSD      0.000    0.000    0.000    0.000   0.000   0.000     0.000     0.000    0.000   0.081   0.088   0.029   0.030                         0.229

iv  HDGV VMIX      0.00     0.00     0.00     0.00    0.00    0.00                0.00     0.00    1.24    2.01    2.50    2.50
  SUMM ADVMT      0.000    0.000    0.000    0.000   0.000   0.000     0.000     0.000    0.000   1.326   1.495   0.713   0.662     4.197     4.197
  EM.FAC G/ML         0        0        0        0       0       0                   0        0   45.94   42.05   48.33   57.03
  EMISS TPSD      0.000    0.000    0.000    0.000   0.000   0.000               0.000    0.000   0.067   0.069   0.038   0.042                         0.216

v   LDDV VMIX      0.00     0.00     0.00     0.00    0.00    0.00                0.00     0.00    1.15    1.03    1.06    1.06
  SUMM ADVMT      0.000    0.000    0.000    0.000   0.000   0.000     0.000     0.000    0.000   1.230   0.766   0.302   0.281     2.579     2.579
  EM.FAC G/ML         0        0        0        0       0       0                   0        0    0.92    0.83    0.97    1.16
  EMISS TPSD      0.000    0.000    0.000    0.000   0.000   0.000               0.000    0.000   0.001   0.001   0.000   0.000                         0.003

vi  LDDT VMIX      0.00     0.00     0.00     0.00    0.00    0.00                0.00     0.00    0.09    0.16    0.12    0.12
  SUMM ADVMT      0.000    0.000    0.000    0.000   0.000   0.000     0.000     0.000    0.000   0.096   0.119   0.034   0.032     0.281     0.281
  EM.FAC G/ML         0        0        0        0       0       0                   0        0    1.05    0.94    1.11    1.32
  EMISS TPSD      0.000    0.000    0.000    0.000   0.000   0.000               0.000    0.000   0.000   0.000   0.000   0.000                         0.000

vii HDDV VMIX      0.00     0.00     0.00     0.00    0.00    0.00      0.00      0.00     0.00    2.06    2.69    2.50    2.50
  SUMMER VMT       0.00     0.00     0.00     0.00    0.00    0.00     0.000      0.00     0.00    2.20    2.00    0.71    0.66     5.580     5.580
  EM.FAC G/ML         0        0        0        0       0       0                   0        0    7.23    6.49    7.65    9.08
  EMISS TPSD      0.000    0.000    0.000    0.000   0.000   0.000               0.000    0.000   0.018   0.014   0.006   0.007                         0.045

iix MC VMIX        0.00     0.00     0.00     0.00    0.00    0.00                0.00     0.00    0.60    0.50    2.40    2.40
  SUMM ADVMT       0.00     0.00     0.00     0.00    0.00    0.00     0.000      0.00     0.00    0.64    0.37    0.68    0.64     2.334     2.334
  EM.FAC G/ML      0.00     0.00     0.00     0.00    0.00    0.00                0.00     0.00   15.42   13.18   16.56   20.11
  EMISS TPSD      0.000    0.000    0.000    0.000   0.000   0.000               0.000    0.000   0.011   0.005   0.012   0.014                         0.043

                                                                                                            COUNTY TOTAL       236.3616    3.918
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MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO ESSEX COUNTY

m5coESSX6a

10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS -- TPSD
1 ADVMT	4020	1852	2765	1865	836	1769	13107	442	110	255	217	27	121	1172	14279	
Summer*1.0188	4095.576	1886.818	2816.982	1900.062	851.717	1802.257	13353.412	450.310	112.07	259.794	221.080	27.508	123.275	1194.034	14547.445	
SPEED	60	48	42	33	36	25		59	50	50	40	33	20			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	3276.461	1609.833	2406.266	1598.712	719.956	1523.448	11134.676	333.139	93.072	217.318	164.638	21.164	94.848	924.179	12058.855	
EM.FAC G/ML	22.17	11.69	12.58	14.73	13.87	18.04		20.07	11.69	11.69	12.95	14.73	21.33			
EMISS TPSD	80.070	20.744	33.368	25.958	11.007	30.295		7.370	1.199	2.800	2.350	0.344	2.230			217.735
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	290.786	110.379	175.780	143.645	64.901	137.332	922.822	26.028	8.024	19.303	28.033	2.638	11.822	95.848	1018.669	
EM.FAC G/ML	28.23	13.97	14.68	16.83	15.93	20.3		25.97	13.97	13.97	15.02	16.83	23.53			
EMISS TPSD	9.049	1.700	2.844	2.665	1.140	3.073		0.745	0.124	0.297	0.464	0.049	0.307			22.456
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	147.850	56.227	89.580	73.152	33.047	69.928	469.784	13.284	4.090	9.820	14.282	1.345	6.028	48.850	518.634	
EM.FAC G/ML	30.8	15.07	16.02	18.53	17.51	22.43		27.66	15.07	15.07	16.45	18.53	26.26			
EMISS TPSD	5.020	0.934	1.582	1.494	0.638	1.729	0.000	0.405	0.068	0.163	0.259	0.027	0.174			12.494
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	73.720	27.548	36.902	25.081	8.517	18.023	189.791	11.303	2.197	3.221	4.444	0.688	3.082	24.934	214.725	
EM.FAC G/ML	52.86	41.19	40.94	47.07	44.05	61.88		51.15	42	42	41.85	47.07	78.86			
EMISS TPSD	4.296	1.251	1.665	1.301	0.414	1.229		0.637	0.102	0.149	0.205	0.036	0.268			11.553
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	45.051	22.264	33.240	22.041	9.965	21.086	153.648	4.593	1.289	2.988	2.277	0.292	1.307	12.745	166.393	
EM.FAC G/ML	0.86	0.76	0.79	0.95	0.88	1.25		0.85	0.77	0.77	0.81	0.95	1.59			
EMISS TPSD	0.043	0.019	0.029	0.023	0.010	0.029		0.004	0.001	0.003	0.002	0.000	0.002			0.165
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	3.686	1.321	2.254	1.710	0.852	1.802	11.624	0.315	0.101	0.234	0.354	0.033	0.148	1.185	12.809	
EM.FAC G/ML	0.98	0.87	0.9	1.08	1	1.43		0.96	0.87	0.87	0.93	1.08	1.81			
EMISS TPSD	0.004	0.001	0.002	0.002	0.001	0.003		0.000	0.000	0.000	0.000	0.000	0.000			0.015
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	233.45	51.70	58.87	28.12	10.22	21.63	403.990	58.95	3.07	5.35	5.95	0.69	3.08	77.085	481.075	
EM.FAC G/ML	6.78	5.99	6.22	7.43	6.89	9.85		6.65	6.01	6.01	6.39	7.73	12.46			
EMISS TPSD	1.745	0.341	0.404	0.230	0.078	0.235		0.432	0.020	0.035	0.042	0.006	0.042			3.610
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	24.57	7.55	14.08	7.60	4.26	9.01	67.076	2.70	0.22	1.56	1.11	0.66	2.96	9.209	76.285	
EM.FAC G/ML	24.17	10.97	12.23	15.97	14.42	21.85		21.53	10.97	10.97	12.83	15.97	27.41			
EMISS TPSD	0.655	0.091	0.190	0.134	0.068	0.217		0.064	0.003	0.019	0.016	0.012	0.089			1.557
													COUNTY TOTAL		14547.445	269.584

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                 MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO FRANKLIN COUNTY

m5coFRAN6a
  10/18/93     INTER-  FREEWY  PRINCIP   MINOR                           VMT    INTER PRINCIPL   MINOR   MAJOR   MINOR                 VMT       VMT     TOTAL
                STATE EXPRESS  ARTERY   ARTERY COLLECT   LOCAL          TOTAL   STATE   ARTERY  ARTERY COLLECT COLLECT   LOCAL       TOTAL     TOTAL EMISSIONS
  COUNTIES     URBAN1  URBAN2  URBAN3   URBAN4  URBAN5  URBAN6          U1-U6  RURAL1   RURAL2  RURAL3  RURAL4  RURAL5  RURAL6      R1-R6 ALL ROADS     TPSD
  --------    ------- ------- -------  ------- ------- -------         ====== ------- ------- ------- ------- ------- -------    ======= ========= ========
 1  ADVMT         209      54      86       88      49      76            562     614     675     473     542     116     343       2763      3325
 Summer*1.0188 212.929 55.015  87.617   89.654  49.921  77.429        572.566 625.543  687.69 481.892 552.190 118.181 349.448   2814.944  3387.510
         SPEED     58      48      36       32      34      33                     58      48      44      43      35      30


 i  LDGV VMIX      80   85.32   85.42    84.14   84.53   84.53                  73.98   83.05   83.65   74.47   76.94   76.94
   SUMM ADVMT 170.343  46.939  74.842   75.435  42.198  65.451        475.209 462.777 571.127 403.103 411.216  90.928 268.866   2208.016  2683.225
   EM.FAC G/ML  17.98   11.69   13.87    14.73   14.43   14.73                  17.98   11.69   12.25   12.41   14.14   15.78
   EMISS TPSD   3.376   0.605   1.144    1.225   0.671   1.063                  9.172   7.359   5.443   5.625   1.417   4.677                          41.778

 ii  LDGT1 VMIX   7.1    5.85    6.24     7.56    7.62    7.62                   5.78    7.16    7.43   12.68    9.59    9.59
   SUMM ADVMT  15.118   3.218   5.467    6.778   3.804   5.900         40.286  36.156  49.239  35.805  70.018  11.334  33.512    236.063   276.348
   EM.FAC G/ML  22.52   13.97   15.93    16.83    16.5   16.83                  22.52   13.97    14.4   14.53    16.2   17.93
   EMISS TPSD   0.375   0.050   0.096    0.126   0.069   0.109                  0.898   0.758   0.568   1.121   0.202   0.662                           5.035

 iii LDGT2 VMIX  3.61    2.98    3.18     3.85    3.88    3.88                   2.95    3.65    3.78    6.46    4.89    4.89
   SUMM ADVMT   7.687   1.639   2.786    3.452   1.937   3.004         20.505  18.454  25.101  18.216  35.671   5.779  17.088    120.308   140.814
   EM.FAC G/ML  24.51   15.07   17.51    18.53   18.17   18.53                  24.51   15.07   15.66   15.84   17.83   19.76
   EMISS TPSD   0.208   0.027   0.054    0.071   0.039   0.061          0.000   0.499   0.417   0.314   0.623   0.114   0.372                           2.798

 iv  HDGV VMIX   1.80    1.46    1.31     1.32    1.00    1.00                   2.51    1.96    1.24    2.01    2.50    2.50
   SUMM ADVMT   3.833   0.803   1.148    1.183   0.499   0.774          8.241  15.701  13.479   5.975  11.099   2.955   8.736     57.945    66.186
   EM.FAC G/ML  49.61   41.19   44.05    47.07   45.94   47.07                  49.61   41.19   40.66   40.76   44.93    51.3
   EMISS TPSD   0.210   0.036   0.056    0.061   0.025   0.040                  0.859   0.612   0.268   0.499   0.146   0.494                           3.306

 v   LDDV VMIX   1.10    1.18    1.18     1.16    1.17    1.17                   1.02    1.15    1.15    1.03    1.06    1.06
   SUMM ADVMT   2.342   0.649   1.034    1.040   0.584   0.906          6.555   6.381   7.908   5.542   5.688   1.253   3.704     30.475    37.030
   EM.FAC G/ML   0.83    0.76    0.88     0.95    0.92    0.95                   0.83    0.76    0.78    0.78     0.9    1.04
   EMISS TPSD   0.002   0.001   0.001    0.001   0.001   0.001                  0.006   0.007   0.005   0.005   0.001   0.004                           0.034

 vi  LDDT VMIX   0.09    0.07    0.08     0.09    0.10    0.10                   0.07    0.09    0.09    0.16    0.12    0.12
   SUMM ADVMT   0.192   0.039   0.070    0.081   0.050   0.077          0.508   0.438   0.619   0.434   0.884   0.142   0.419      2.935     3.443
   EM.FAC G/ML   0.95    0.87       1     1.08    1.05    1.08                   0.95    0.87    0.89    0.89    1.02    1.18
   EMISS TPSD   0.000   0.000   0.000    0.000   0.000   0.000                  0.000   0.001   0.000   0.001   0.000   0.001                           0.004

 vii HDDV VMIX   5.70    2.74    2.09     1.48    1.20    1.20                  13.09    2.74    2.06    2.69    2.50    2.50
   SUMMER VMT   12.14    1.51    1.83     1.33    0.60    0.93         18.331   81.88   18.84    9.93   14.85    2.95    8.74    137.198   155.529
   EM.FAC G/ML   6.52    5.99    6.89     7.43    7.23    7.43                   6.52    5.99     6.1    6.15    7.05    8.14
   EMISS TPSD   0.087   0.010   0.014    0.011   0.005   0.008                  0.588   0.124   0.067   0.101   0.023   0.078                           1.116

 iix MC VMIX     0.60    0.40    0.50     0.40    0.50    0.50                   0.60    0.20    0.60    0.50    2.40    2.40
   SUMM ADVMT    1.28    0.22    0.44     0.36    0.25    0.39          2.931    3.75    1.38    2.89    2.76    2.84    8.39     22.004    24.935
   EM.FAC G/ML  18.89   10.97   14.42    15.97   15.42   15.97                  18.89   10.97   11.73   11.96   14.90   17.86
   EMISS TPSD   0.027   0.003   0.007    0.006   0.004   0.007                  0.078   0.017   0.037   0.036   0.047   0.165                           0.434

                                                                                                            COUNTY TOTAL      3387.51    54.505
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MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO HAMPDEN COUNTY

m5coHAMD6a

10/19/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 BARN ADVMT	2159	178	2361	1517	573	1113	7901	833	0	343	354	57	173	1760	9661	
Summer*1.0188	2199.589	181.346	2405.387	1545.520	583.772	1133.924	8049.539	848.660	0.00	349.448	360.655	58.072	176.252	1793.088	9842.627	
SPEED	59	44	42	39	37	24		60	NA	42	37	36	29			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	1759.671	154.725	2054.681	1300.400	493.463	958.506	6721.447	627.839	0.000	292.314	268.580	44.680	135.609	1369.021	8090.468	
EM.FAC G/ML	20.07	12.25	12.58	13.16	13.62	18.6		22.17	0	12.58	13.62	13.87	16.17			
EMISS TPSD	38.929	2.089	28.492	18.864	7.409	19.652		15.343	0.000	4.053	4.032	0.683	2.417			141.965
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	156.171	10.609	150.096	116.841	44.483	86.405	564.606	49.053	0.000	25.964	45.731	5.569	16.903	143.219	707.825	
EM.FAC G/ML	25.37	14.4	14.68	15.22	15.67	20.86		28.23	0	14.68	15.67	15.93	18.35			
EMISS TPSD	4.367	0.168	2.429	1.960	0.768	1.987		1.526	0.000	0.420	0.790	0.098	0.342			14.856
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	79.405	5.404	76.491	59.503	22.650	43.996	287.450	25.035	0.000	13.209	23.298	2.840	8.619	73.001	360.451	
EM.FAC G/ML	27.66	15.66	16.02	16.69	17.22	23.08		30.8	0	16.02	17.22	17.51	20.23			
EMISS TPSD	2.421	0.093	1.351	1.095	0.430	1.119	0.000	0.850	0.000	0.233	0.442	0.055	0.192			8.281
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	39.593	2.648	31.511	20.401	5.838	11.339	111.329	21.301	0.000	4.333	7.249	1.452	4.406	38.742	150.070	
EM.FAC G/ML	51.15	40.66	40.94	42.05	43.28	64.67		52.86	0	40.94	43.28	44.05	53.03			
EMISS TPSD	2.232	0.119	1.422	0.946	0.279	0.808		1.241	0.000	0.196	0.346	0.070	0.258			7.916
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	24.195	2.140	28.384	17.928	6.830	13.267	92.744	8.656	0.000	4.019	3.715	0.616	1.868	18.874	111.618	
EM.FAC G/ML	0.85	0.78	0.79	0.83	0.86	1.31		0.86	0	0.79	0.86	0.88	1.07			
EMISS TPSD	0.023	0.002	0.025	0.016	0.006	0.019		0.008	0.000	0.003	0.004	0.001	0.002			0.109
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	1.980	0.127	1.924	1.391	0.584	1.134	7.140	0.594	0.000	0.315	0.577	0.070	0.212	1.767	8.906	
EM.FAC G/ML	0.96	0.89	0.9	0.94	0.98	1.49		0.98	0	0.9	0.98	1	1.22			
EMISS TPSD	0.002	0.000	0.002	0.001	0.001	0.002		0.001	0.000	0.000	0.001	0.000	0.000			0.010
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	125.38	4.97	50.27	22.87	7.01	13.61	224.104	111.09	0.00	7.20	9.70	1.45	4.41	133.848	357.952	
EM.FAC G/ML	6.65	6.1	6.22	6.49	6.74	10.28		6.78	0	6.22	6.74	6.89	8.43			
EMISS TPSD	0.919	0.033	0.345	0.164	0.052	0.154		0.830	0.000	0.049	0.072	0.011	0.041			2.671
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	13.20	0.73	12.03	6.18	2.92	5.67	40.720	5.09	0.00	2.10	1.80	1.39	4.23	14.616	55.336	
EM.FAC G/ML	21.53	11.73	12.23	13.18	13.97	22.80		24.17	0.00	12.23	13.97	14.42	18.57			
EMISS TPSD	0.313	0.009	0.162	0.090	0.045	0.142		0.136	0.000	0.028	0.028	0.022	0.087			1.062
													COUNTY TOTAL		9842.6268	176.871

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO HAMPSHIRE COUNTY

m5coHAMS6a 10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS - TPSD
1 ADVMT	270	117	764	556	155	294	2156	128	324	502	361	75	218	1608	3764	
Summer*1.0188	275.076	119.200	778.363	566.453	157.914	299.527	2196.533	130.406	330.09	511.438	367.787	76.410	222.098	1638.230	3834.763	
SPEED	59	46	35	32	28	20		59	46	43	33	39	37			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	220.061	101.701	664.878	476.613	133.485	253.190	1849.928	96.475	274.141	427.818	273.891	58.790	170.883	1301.996	3151.924	
EM.FAC G/ML	20.07	11.95	14.14	14.73	16.59	21.33		20.07	11.95	12.41	14.73	13.16	13.62			
EMISS TPSD	4.868	1.340	10.363	7.739	2.441	5.953		2.134	3.611	5.852	4.447	0.853	2.566			52.167
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	19.530	6.973	48.570	42.824	12.033	22.824	152.754	7.537	23.635	38.000	46.635	7.328	21.299	144.434	297.188	
EM.FAC G/ML	25.37	14.17	16.2	16.83	18.8	23.53		25.37	14.17	14.53	16.83	15.22	15.67			
EMISS TPSD	0.546	0.109	0.867	0.794	0.249	0.592		0.211	0.369	0.609	0.865	0.123	0.368			5.703
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	9.930	3.552	24.752	21.808	6.127	11.622	77.791	3.847	12.048	19.332	23.759	3.736	10.861	73.584	151.375	
EM.FAC G/ML	27.66	15.35	17.83	18.53	20.73	26.26		27.66	15.36	15.84	18.53	16.69	17.22			
EMISS TPSD	0.303	0.060	0.486	0.445	0.140	0.336	0.000	0.117	0.204	0.338	0.485	0.069	0.206			3.190
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	4.951	1.740	10.197	7.477	1.579	2.995	28.940	3.273	6.470	6.342	7.393	1.910	5.552	30.940	59.880	
EM.FAC G/ML	51.15	40.74	44.93	42.07	54.93	78.86		51.15	40.74	40.76	47.07	42.05	43.28			
EMISS TPSD	0.279	0.078	0.505	0.347	0.096	0.260		0.185	0.291	0.285	0.384	0.089	0.265			3.062
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	3.026	1.407	9.185	6.571	1.848	3.504	25.540	1.330	3.796	5.882	3.788	0.810	2.354	17.960	43.500	
EM.FAC G/ML	0.85	0.77	0.9	0.95	1.11	1.59		0.85	0.77	0.78	0.95	0.83	0.86			
EMISS TPSD	0.003	0.001	0.009	0.007	0.002	0.006		0.001	0.003	0.005	0.004	0.001	0.002			0.045
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.248	0.083	0.623	0.510	0.158	0.300	1.921	0.091	0.297	0.460	0.588	0.092	0.267	1.795	3.716	
EM.FAC G/ML	0.96	0.87	1.02	1.08	1.27	1.81		0.96	0.87	0.97	1.08	0.94	0.98			
EMISS TPSD	0.000	0.000	0.001	0.001	0.000	0.001		0.000	0.000	0.000	0.001	0.000	0.000			0.004
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	15.68	3.27	16.27	8.38	1.89	3.59	49.086	17.07	9.04	10.54	9.89	1.91	5.55	54.006	103.092	
EM.FAC G/ML	6.65	6.02	7.05	7.43	8.74	12.46		6.65	6.02	6.15	7.43	6.49	6.74			
EMISS TPSD	0.115	0.022	0.126	0.069	0.018	0.049		0.125	0.060	0.071	0.081	0.014	0.041			0.792
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.65	0.48	3.89	2.27	0.79	1.50	10.572	0.78	0.66	3.07	1.84	1.83	5.33	13.514	24.086	
EM.FAC G/ML	21.53	11.32	14.90	15.97	19.32	27.41		21.53	11.32	11.96	15.97	13.18	13.97			
EMISS TPSD	0.039	0.006	0.064	0.040	0.017	0.045		0.019	0.008	0.040	0.032	0.027	0.082			0.419
												COUNTY TOTAL			3834.7632	65.383

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO MIDDLESEX COUNTY

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m5coMDSX6a
  10/18/93    INTER-    FREEWY  PRINCIP    MINOR                            VMT      INTER PRINCIPL   MINOR   MAJOR   MINOR                 VMT       VMT     TOTAL
               STATE   EXPRESS   ARTERY   ARTERY COLLECT    LOCAL         TOTAL      STATE   ARTERY  ARTERY COLLECT COLLECT   LOCAL      TOTAL     TOTAL EMISSIONS
  COUNTIES    URBAN1    URBAN2   URBAN3   URBAN4  URBAN5   URBAN6         U1-U6     RURAL1   RURAL2  RURAL3  RURAL4  RURAL5  RURAL6      R1-R6 ALL ROADS      TPSD
  --------   -------   -------  -------  -------  ------- -------        ======    ------- ------- ------- ------- ------- -------    ======= ========= ========
 1  ADVMT       8186      3352     5663     3025    2158     3869         26253        527     166     486     244      67     183       1673     27926
Summer*1.0188 8339.897 3415.018 5769.464 3081.870 2198.57 3941.737 26746.556    536.908  169.12 495.137 248.587  68.260 186.440   1704.452 28451.009
      SPEED        60        54       44       44      25       28                      60      42      43      39      33      34


i   LDGV VMIX       80     85.32    85.42    84.14   84.53    84.53                  73.98   83.05   83.65   74.47   76.94   76.94
   SUMM ADVMT 6671.917 2913.693 4928.276 2593.085 1858.45 3331.950 22297.374    397.204 140.455 414.182 185.123  52.519 143.447   1332.930 23630.304
   EM.FAC G/ML   22.17     11.69    12.25    12.25   18.04    16.59                  22.17   12.58   12.41   13.16   14.73   14.43
   EMISS TPSD  163.048    37.546   66.547   35.015  36.956   60.932                  9.707   1.948   5.666   2.685   0.853   2.282                          423.184

ii  LDGT1 VMIX     7.1      5.85     6.24     7.56    7.62     7.62                   5.78    7.16    7.43   12.68    9.59    9.59
   SUMM ADVMT  592.133   199.779  360.015  232.989 167.531  300.360  1852.807     31.033  12.109  36.789  31.521   6.546  17.880    135.878  1988.684
   EM.FAC G/ML   28.23     13.97     14.4     14.4    20.3     18.8                  28.23   14.68   14.53   15.22   16.83    16.5
   EMISS TPSD   18.426     3.076    5.715    3.698   3.749    6.224                  0.966   0.196   0.589   0.529   0.121   0.325                           43.615

iii LDGT2 VMIX    3.61      2.98     3.18     3.85    3.88     3.88                   2.95    3.65    3.78    6.46    4.89    4.89
   SUMM ADVMT  301.070   101.768  183.469  118.652  85.305  152.939   943.203     15.839   6.173  18.716  16.059   3.338   9.117     69.241  1012.444
   EM.FAC G/ML    30.8     15.07    15.66    15.66   22.43    20.73                   30.8   16.02   15.84   16.69   18.53   18.17
   EMISS TPSD   10.222     1.691    3.167    2.048   2.109    3.495     0.000      0.538   0.109   0.327   0.295   0.068   0.183                           24.251

iv  HDGV VMIX     1.80      1.46     1.31     1.32    1.00     1.00                   2.51    1.96    1.24    2.01    2.50    2.50
   SUMM ADVMT  150.118    49.859   75.580   40.681  21.986   39.417   377.641     13.476   3.315   6.140   4.997   1.706   4.661     34.295   411.936
   EM.FAC G/ML   52.86     44.85    40.66    40.66   61.88    54.93                  52.86   40.94   40.76   42.05   47.07   45.94
   EMISS TPSD    8.747     2.465    3.387    1.823   1.500    2.387                  0.785   0.150   0.276   0.232   0.089   0.236                           22.076

v   LDDV VMIX     1.10      1.18     1.18     1.16    1.17     1.17                   1.02    1.15    1.15    1.03    1.06    1.06
   SUMM ADVMT   91.739    40.297   68.080   35.750  25.723   46.118   307.707      5.476   1.945   5.694   2.560   0.724   1.976     18.376   326.083
   EM.FAC G/ML    0.86      0.79     0.78     0.78    1.25     1.11                   0.86    0.79    0.78    0.83    0.95    0.92
   EMISS TPSD    0.087     0.035    0.059    0.031   0.035    0.056                  0.005   0.002   0.005   0.002   0.001   0.002                            0.320

vi  LDDT VMIX     0.09      0.07     0.08     0.09    0.10     0.10                   0.07    0.09    0.09    0.16    0.12    0.12
   SUMM ADVMT    7.506     2.391    4.616    2.774   2.199    3.942    23.426      0.376   0.152   0.446   0.398   0.082   0.224      1.677    25.103
   EM.FAC G/ML    0.98       0.9     0.89     0.89    1.43     1.27                   0.98     0.9    0.89    0.94    1.08    1.05
   EMISS TPSD    0.008     0.002    0.005    0.003   0.003    0.006                  0.000   0.000   0.000   0.000   0.000   0.000                            0.028

vii HDDV VMIX     5.70      2.74     2.09     1.48    1.20     1.20                  13.09    2.74    2.06    2.69    2.50    2.50
   SUMMER VMT   475.37     93.57   120.58    45.61   26.38    47.30   808.823      70.28    4.63   10.20    6.69    1.71    4.66     98.169   906.992
   EM.FAC G/ML    6.78      6.17      6.1      6.1    9.85     8.74                   6.78    6.22    6.15    6.49    7.43    7.23
   EMISS TPSD    3.553     0.636    0.811    0.307   0.286    0.456                  0.525   0.032   0.069   0.048   0.014   0.037                            6.774

iix MC VMIX       0.60      0.40     0.50     0.40    0.50     0.50                   0.60    0.20    0.60    0.50    2.40    2.40
   SUMM ADVMT    50.04     13.66    28.85    12.33   10.99    19.71   135.576       3.22    0.34    2.97    1.24    1.64    4.47     13.886   149.462
   EM.FAC G/ML   24.17     10.97    11.73    11.73   21.85    19.32                  24.17   12.23   11.96   13.18   15.97   15.42
   EMISS TPSD    1.333     0.165    0.373    0.159   0.265    0.420                  0.086   0.005   0.039   0.018   0.029   0.076                            2.968

                                                                                                                   COUNTY TOTAL      28451.008   523.216
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                MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO NANTUCKET COUNTY

m5coNANT6a
  10/18/93    INTER-   FREEWY  PRINCIP   MINOR                         VMT       INTER PRINCIPL  MINOR   MAJOR   MINOR                VMT        VMT    TOTAL
               STATE  EXPRESS   ARTERY  ARTERY COLLECT   LOCAL       TOTAL       STATE  ARTERY  ARTERY COLLECT COLLECT   LOCAL      TOTAL      TOTAL EMISSIONS
  COUNTIES    URBAN1   URBAN2   URBAN3  URBAN4  URBAN5  URBAN6       U1-U6      RURAL1  RURAL2  RURAL3  RURAL4  RURAL5  RURAL6     R1-R6 ALL ROADS    TPSD
  --------   -------  -------  ------- ------- ------- -------      ======     ------- ------- ------- ------- ------- -------   ======= ========= ========
 1  ADVMT          0        0        0       0       0       0           0           0       0       0      55      14      30        99        99
Summer*1.0188  0.000    0.000    0.000   0.000   0.000   0.000       0.000       0.000    0.00   0.000  56.034  14.263  30.564   100.861   100.861
       SPEED      NA       NA       NA      NA      NA      NA                      NA      NA      NA      35      40      23


i   LDGV VMIX      0        0        0       0       0       0           0   0       0       0       0   74.47   76.94   76.94
  SUMM ADVMT   0.000    0.000    0.000   0.000   0.000   0.000       0.000       0.000   0.000   0.000  41.729  10.974  23.516    76.219    76.219
  EM.FAC G/ML      0        0        0       0       0       0           0           0       0       0   14.14   12.95    19.2
  EMISS TPSD   0.000    0.000    0.000   0.000   0.000   0.000                   0.000   0.000   0.000   0.650   0.157   0.498                        1.305

ii  LDGT1 VMIX     0        0        0       0       0       0           0   0       0       0       0   12.68    9.59    9.59
  SUMM ADVMT   0.000    0.000    0.000   0.000   0.000   0.000       0.000       0.000   0.000   0.000   7.105   1.368   2.931    11.404    11.404
  EM.FAC G/ML      0        0        0       0       0       0                       0       0       0    16.2   15.02   21.46
  EMISS TPSD   0.000    0.000    0.000   0.000   0.000   0.000                   0.000   0.000   0.000   0.127   0.023   0.069                        0.219

iii LDGT2 VMIX     0        0        0       0       0       0           0   0       0       0       0    6.46    4.89    4.89
  SUMM ADVMT   0.000    0.000    0.000   0.000   0.000   0.000       0.000       0.000   0.000   0.000   3.620   0.697   1.495     5.812     5.812
  EM.FAC G/ML      0        0        0       0       0       0                       0       0       0   17.83   16.45   23.78
  EMISS TPSD   0.000    0.000    0.000   0.000   0.000   0.000       0.000       0.000   0.000   0.000   0.071   0.013   0.039                        0.123

iv  HDGV VMIX      0        0        0       0       0       0           0   0       0       0       0    2.01    2.50    2.50
  SUMM ADVMT   0.000    0.000    0.000   0.000   0.000   0.000       0.000       0.000   0.000   0.000   1.126   0.357   0.764     2.247     2.247
  EM.FAC G/ML      0        0        0       0       0       0                       0       0       0   44.93   41.58   67.73
  EMISS TPSD   0.000    0.000    0.000   0.000   0.000   0.000                   0.000   0.000   0.000   0.056   0.016   0.057                        0.129

v   LDDV VMIX      0        0        0       0       0       0           0   0       0       0       0    1.03    1.06    1.06
  SUMM ADVMT   0.000    0.000    0.000   0.000   0.000   0.000       0.000       0.000   0.000   0.000   0.577   0.151   0.324     1.052     1.052
  EM.FAC G/ML      0        0        0       0       0       0                       0       0       0     0.9    0.81    1.37
  EMISS TPSD   0.000    0.000    0.000   0.000   0.000   0.000                   0.000   0.000   0.000   0.001   0.000   0.000                        0.001

vi  LDDT VMIX      0        0        0       0       0       0           0   0       0       0       0    0.16    0.12    0.12
  SUMM ADVMT   0.000    0.000    0.000   0.000   0.000   0.000       0.000       0.000   0.000   0.000   0.090   0.017   0.037     0.143     0.143
  EM.FAC G/ML      0        0        0       0       0       0                       0       0       0    1.02    0.93    1.56
  EMISS TPSD   0.000    0.000    0.000   0.000   0.000   0.000                   0.000   0.000   0.000   0.000   0.000   0.000                        0.000

vii HDDV VMIX      0        0        0       0       0       0           0   0       0       0       0    2.69    2.50    2.50
  SUMMER VMT    0.00     0.00     0.00    0.00    0.00    0.00       0.000        0.00    0.00    0.00    1.51    0.36    0.76     2.628     2.628
  EM.FAC G/ML      0        0        0       0       0       0                       0       0       0    7.05    6.39   10.76
  EMISS TPSD   0.000    0.000    0.000   0.000   0.000   0.000                   0.000   0.000   0.000   0.012   0.003   0.009                        0.023

iix MC VMIX        0        0        0       0       0       0           0   0       0       0       0    0.50    2.40    2.40
  SUMM ADVMT    0.00     0.00     0.00    0.00    0.00    0.00       0.000        0.00    0.00    0.00    0.28    0.34    0.73     1.356     1.356
  EM.FAC G/ML   0.00     0.00     0.00    0.00    0.00    0.00                    0.00    0.00    0.00   14.90   12.83   23.82
  EMISS TPSD   0.000    0.000    0.000   0.000   0.000   0.000                   0.000   0.000   0.000   0.005   0.005   0.019                        0.029

                                                                                                        COUNTY TOTAL       100.8612    1.829
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MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO NORFOLK COUNTY

m5coNORF6a 10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	5016	1107	3652	1967	954	1959	14655	126	0	117	50	8	29	330	14985	
Summer*1.0188	5110.301	1127.812	3720.658	2003.980	971.935	1995.829	14930.514	128.369	0.00	119.200	50.940	8.150	29.545	336.204	15266.718	
SPEED	60	51	39	36	32	29		60	NA	52	39	39	31			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	4088.241	962.249	3178.186	1686.148	821.577	1687.074	12423.475	94.967	0.000	99.710	37.935	6.271	22.732	261.616	12685.091	
EM.FAC G/ML	22.17	11.69	13.16	13.87	15.06	16.17		22.17	0	11.69	13.16	13.16	15.41			
EMISS TPSD	99.908	12.399	46.104	25.779	13.639	30.071		2.321	0.000	1.285	0.550	0.091	0.386			232.533
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	362.831	65.977	232.169	151.501	74.061	152.082	1038.622	7.420	0.000	8.857	6.459	0.782	2.833	26.350	1064.972	
EM.FAC G/ML	28.23	13.97	15.22	15.93	17.17	18.35		28.23	0	13.97	15.22	15.22	17.54			
EMISS TPSD	11.291	1.016	3.895	2.660	1.402	3.076		0.231	0.000	0.136	0.108	0.013	0.055			23.883
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	184.482	33.609	118.317	77.153	37.711	77.438	528.710	3.787	0.000	4.506	3.291	0.399	1.445	13.427	542.137	
EM.FAC G/ML	30.8	15.07	16.69	17.51	18.91	20.23		30.8	0	15.07	16.69	16.69	19.32			
EMISS TPSD	6.263	0.558	2.177	1.489	0.786	1.727	0.000	0.129	0.000	0.075	0.061	0.007	0.031			13.302
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	91.985	16.466	48.741	26.453	9.719	19.958	213.322	3.222	0.000	1.478	1.024	0.204	0.739	6.666	219.989	
EM.FAC G/ML	52.86	42.55	42.05	44.05	48.33	53.03		52.86	0	43.21	42.05	42.05	49.74			
EMISS TPSD	5.360	0.772	2.259	1.284	0.518	1.167		0.188	0.000	0.070	0.047	0.009	0.040			11.716
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	56.213	13.308	43.904	23.246	11.372	23.351	171.394	1.309	0.000	1.371	0.525	0.086	0.313	3.604	174.999	
EM.FAC G/ML	0.86	0.77	0.83	0.88	0.97	1.07		0.86	0	0.77	0.83	0.83	1			
EMISS TPSD	0.053	0.011	0.040	0.023	0.012	0.028		0.001	0.000	0.001	0.000	0.000	0.000			0.170
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	4.599	0.789	2.977	1.804	0.972	1.996	13.137	0.090	0.000	0.107	0.082	0.010	0.035	0.324	13.460	
EM.FAC G/ML	0.98	0.88	0.94	1	1.11	1.22		0.98	0	0.88	0.94	0.94	1.14			
EMISS TPSD	0.005	0.001	0.003	0.002	0.001	0.003		0.000	0.000	0.000	0.000	0.000	0.000			0.015
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	291.29	30.90	77.76	29.66	11.66	23.95	465.223	16.80	0.00	2.46	1.37	0.20	0.74	21.572	486.795	
EM.FAC G/ML	6.78	6.03	6.49	6.89	7.65	8.43		6.78	0	6.07	6.49	6.49	7.88			
EMISS TPSD	2.177	0.205	0.556	0.225	0.098	0.223		0.126	0.000	0.016	0.010	0.001	0.006			3.645
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	30.66	4.51	18.60	8.02	4.86	9.98	76.631	0.77	0.00	0.72	0.25	0.20	0.71	2.645	79.276	
EM.FAC G/ML	24.17	10.97	13.18	14.42	16.56	18.57		24.17	0.00	10.97	13.18	13.18	17.19			
EMISS TPSD	0.817	0.055	0.270	0.127	0.089	0.204		0.021	0.000	0.009	0.004	0.003	0.013			1.611
														COUNTY TOTAL	15266.718	286.876

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO PLYMOUTH COUNTY

m5coPLYM6a

10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	241	704	2222	1269	616	945	5997	811	628	309	410	148	329	2635	8632	
Summer*1.0188	245.531	717.235	2263.774	1292.857	627.581	962.766	6109.744	826.247	639.81	314.809	417.708	150.782	335.185	2684.538	8794.282	
SPEED	60	60	44	40	29	28		60	58	51	48	31	27			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	196.425	611.945	1933.715	1087.810	530.494	813.826	5174.215	611.257	531.359	263.338	311.067	116.012	257.891	2090.925	7265.140	
EM.FAC G/ML	22.17	22.17	12.25	12.95	16.17	16.59		22.17	17.98	11.69	11.69	15.41	17.04			
EMISS TPSD	4.800	14.955	26.111	15.528	9.456	14.883		14.938	10.531	3.393	4.008	1.971	4.844			125.418
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	17.433	41.958	141.259	97.740	47.822	73.363	419.575	47.757	45.810	23.390	52.965	14.460	32.144	216.527	636.102	
EM.FAC G/ML	28.23	28.23	14.4	15.02	18.35	18.8		28.23	22.52	13.97	13.97	17.54	19.27			
EMISS TPSD	0.542	1.306	2.242	1.618	0.967	1.520		1.486	1.137	0.360	0.816	0.280	0.683			12.958
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	8.864	21.374	71.988	49.775	24.350	37.355	213.706	24.374	23.353	11.900	26.984	7.373	16.391	110.375	324.080	
EM.FAC G/ML	30.81	30.8	15.66	16.45	20.23	20.73		30.8	24.51	15.07	15.07	19.32	21.26			
EMISS TPSD	0.301	0.726	1.243	0.903	0.543	0.854	0.000	0.828	0.631	0.198	0.448	0.157	0.384			7.214
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	4.420	10.472	29.655	17.066	6.276	9.628	77.516	20.739	12.540	3.904	8.396	3.770	8.380	57.728	135.244	
EM.FAC G/ML	52.86	52.86	40.66	41.58	53.03	54.93		52.86	49.61	42.55	41.19	49.74	57.03			
EMISS TPSD	0.258	0.610	1.329	0.782	0.367	0.583		1.208	0.686	0.183	0.381	0.207	0.527			7.121
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	2.701	8.463	26.713	14.997	7.343	11.264	71.481	8.428	7.358	3.620	4.302	1.598	3.553	28.859	100.340	
EM.FAC G/ML	0.86	0.86	0.78	0.81	1.07	1.11		0.86	0.83	0.77	0.76	1	1.16			
EMISS TPSD	0.003	0.008	0.023	0.013	0.009	0.014		0.008	0.007	0.003	0.004	0.002	0.005			0.097
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.221	0.502	1.811	1.164	0.628	0.963	5.288	0.578	0.576	0.283	0.668	0.181	0.402	2.689	7.977	
EM.FAC G/ML	0.98	0.98	0.89	0.93	1.22	1.27		0.98	0.95	0.88	0.87	1.14	1.32			
EMISS TPSD	0.000	0.001	0.002	0.001	0.001	0.001		0.001	0.001	0.000	0.001	0.000	0.001			0.009
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	14.00	19.65	47.31	19.13	7.53	11.55	119.179	108.16	17.53	6.49	11.24	3.77	8.38	155.557	274.736	
EM.FAC G/ML	6.78	6.78	6.1	6.39	8.43	8.74		6.78	6.54	6.03	5.99	7.88	9.08			
EMISS TPSD	0.105	0.147	0.318	0.135	0.070	0.111		0.808	0.126	0.043	0.074	0.033	0.084			2.054
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.47	2.87	11.32	5.17	3.14	4.81	28.784	4.96	1.28	1.89	2.09	3.62	8.04	21.878	50.662	
EM.FAC G/ML	24.17	24.17	11.73	12.83	18.57	19.32		24.17	18.89	10.97	10.97	17.19	20.11			
EMISS TPSD	0.039	0.076	0.146	0.073	0.064	0.103		0.132	0.027	0.023	0.025	0.069	0.178			0.956
														COUNTY TOTAL	8794.2816	155.826

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO SUFFOLK COUNTY

m5coSUFF6a
10/18/93

COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 ADVMT	1531	1414	1957	858	280	827	6867	NA	NA	NA	NA	NA	NA	0	6867	
Summer*1.0188	1559.783	1440.583	1993.792	874.130	285.264	842.548	6996.100	0.000	0.00	0.000	0.000	0.000	0.000	0.000	6996.100	
SPEED	57	43	34	30	31	29		NA	NA	NA	NA	NA	NA			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		0	0	0	0	0	0			
SUMM ADVMT	1247.826	1229.106	1703.097	735.493	241.134	712.205	5868.861	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5868.861	
EM.FAC G/ML	15.88	12.41	14.43	15.78	15.41	16.17										
EMISS TPSD	21.843	16.814	27.090	12.793	4.096	12.694		0.000	0.000	0.000	0.000	0.000	0.000			95.330
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		0	0	0	0	0	0			
SUMM ADVMT	110.745	84.274	124.413	66.084	21.737	64.202	471.455	0.000	0.000	0.000	0.000	0.000	0.000	0.000	471.455	
EM.FAC G/ML	19.67	14.53	16.5	17.93	17.54	18.35										
EMISS TPSD	2.401	1.350	2.263	1.306	0.420	1.299		0.000	0.000	0.000	0.000	0.000	0.000			9.039
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		0	0	0	0	0	0			
SUMM ADVMT	56.308	42.929	63.403	33.654	11.068	32.691	240.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	240.053	
EM.FAC G/ML	21.37	15.84	18.17	18.76	19.32	20.23										
EMISS TPSD	1.326	0.750	1.270	0.696	0.236	0.729	0.000	0.000	0.000	0.000	0.000	0.000	0.000			5.006
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		0	0	0	0	0	0			
SUMM ADVMT	28.076	21.033	26.119	11.539	2.853	8.425	98.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.044	
EM.FAC G/ML	48.21	40.76	45.94	51.3	49.74	53.03										
EMISS TPSD	1.492	0.945	1.323	0.652	0.156	0.493		0.000	0.000	0.000	0.000	0.000	0.000			5.061
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		0	0	0	0	0	0			
SUMM ADVMT	17.158	16.999	23.527	10.140	3.338	9.858	81.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	81.019	
EM.FAC G/ML	0.82	0.78	0.92	1.04	1	1.07										
EMISS TPSD	0.016	0.015	0.024	0.012	0.004	0.012		0.000	0.000	0.000	0.000	0.000	0.000			0.081
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0	0	0	0	0	0			
SUMM ADVMT	1.404	1.008	1.595	0.787	0.285	0.843	5.922	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.922	
EM.FAC G/ML	0.93	0.89	1.05	1.18	1.14	1.22										
EMISS TPSD	0.001	0.001	0.002	0.001	0.000	0.001		0.000	0.000	0.000	0.000	0.000	0.000			0.007
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		0	0	0	0	0	0			
SUMMER VMT	88.91	39.47	41.67	12.94	3.42	10.11	196.521	0.00	0.00	0.00	0.00	0.00	0.00	0.000	196.521	
EM.FAC G/ML	6.42	6.15	7.23	8.14	7.88	8.43										
EMISS TPSD	0.629	0.268	0.332	0.116	0.030	0.094		0.000	0.000	0.000	0.000	0.000	0.000			1.469
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0	0	0	0	0	0			
SUMM ADVMT	9.36	5.76	9.97	3.50	1.43	4.21	34.226	0.00	0.00	0.00	0.00	0.00	0.00	0.000	34.226	
EM.FAC G/ML	16.25	11.96	15.42	17.86	17.19	18.57										
EMISS TPSD	0.168	0.076	0.169	0.069	0.027	0.086		0.000	0.000	0.000	0.000	0.000	0.000			0.595
													COUNTY TOTAL		6996.0996	116.588

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO WORCESTER COUNTY

m5coWORC6a

10/18/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS TPSD
1 BARN ADVMT	3886	1314	3473	1460	738	1208	12079	1465	453	1520	981	205	562	5186	17265	
Summer*1.0188	3959.057	1338.703	3538.292	1487.448	751.874	1230.710	12306.085	1492.54	461.52	1548.58	999.443	208.854	572.566	5283.497	17589.582	
SPEED	54	57	45	39	40	28		59	43	53	40	35	25			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	3167.245	1142.182	3022.409	1251.539	635.559	1040.320	10259.254	1104.18	383.29	1295.38	744.285	160.692	440.532	4128.365	14387.619	
EM.FAC G/ML	11.69	15.88	12.1	13.16	12.95	16.59		20.07	12.41	11.69	12.95	14.14	18.04			
EMISS TPSD	40.813	19.993	40.312	18.155	9.072	19.024		24.428	5.243	16.692	10.625	2.505	8.760			215.623
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	281.093	78.314	220.789	112.451	57.293	93.780	843.721	86.269	33.045	115.059	126.729	20.029	54.909	436.040	1279.761	
EM.FAC G/ML	13.97	19.67	14.28	15.22	15.02	18.8		25.37	14.53	13.97	15.02	16.2	20.3			
EMISS TPSD	4.329	1.698	3.475	1.887	0.949	1.943		2.413	0.529	1.772	2.098	0.358	1.229			22.679
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	142.922	39.893	112.518	57.267	29.173	47.752	429.524	44.030	16.845	58.536	64.564	10.213	27.998	222.187	651.711	
EM.FAC G/ML	15.07	21.37	15.5	16.69	16.45	20.73		27.66	15.84	15.07	16.45	17.83	22.43			
EMISS TPSD	2.374	0.940	1.922	1.054	0.529	1.091	0.000	1.342	0.294	0.972	1.171	0.201	0.692			12.583
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	71.263	19.545	46.352	19.634	7.519	12.307	176.620	37.463	9.046	19.202	20.089	5.221	14.314	105.335	281.955	
EM.FAC G/ML	44.85	48.21	40.66	42.05	41.58	54.93		51.15	40.76	43.97	41.58	44.93	61.88			
EMISS TPSD	3.523	1.039	2.077	0.910	0.345	0.745		2.112	0.406	0.931	0.921	0.259	0.976			14.244
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	43.550	15.797	41.752	17.254	8.797	14.399	141.549	15.224	5.307	17.809	10.294	2.214	6.069	56.917	198.466	
EM.FAC G/ML	0.79	0.82	0.77	0.83	0.81	1.11		0.85	0.78	0.78	0.81	0.9	1.25			
EMISS TPSD	0.038	0.014	0.035	0.016	0.008	0.018		0.014	0.005	0.015	0.009	0.002	0.008			0.183
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	3.563	0.937	2.831	1.339	0.752	1.231	10.652	1.045	0.415	1.394	1.599	0.251	0.687	5.391	16.043	
EM.FAC G/ML	0.9	0.93	0.88	0.94	0.93	1.27		0.96	0.89	0.89	0.93	1.02	1.43			
EMISS TPSD	0.004	0.001	0.003	0.001	0.001	0.002		0.001	0.000	0.001	0.002	0.000	0.001			0.017
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	225.67	36.68	73.95	22.01	9.02	14.77	382.102	195.37	12.65	31.90	26.89	5.22	14.31	286.340	668.443	
EM.FAC G/ML	6.17	6.42	6.06	6.49	6.39	8.74		6.65	6.15	6.11	6.39	7.05	9.85			
EMISS TPSD	1.535	0.260	0.494	0.157	0.064	0.142		1.432	0.086	0.215	0.189	0.041	0.155			4.770
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	23.75	5.35	17.69	5.95	3.76	6.15	62.663	8.96	0.92	9.29	5.00	5.01	13.74	42.921	105.584	
EM.FAC G/ML	10.97	16.25	11.51	13.18	12.83	19.32		21.53	11.96	10.97	12.83	14.90	21.85			
EMISS TPSD	0.287	0.096	0.224	0.086	0.053	0.131		0.213	0.012	0.112	0.071	0.082	0.331			1.699
														COUNTY TOTAL	17589.582	271.798

ON-ROAD MOBILE-5.a EMISSIONS 1990 BY VEHICLE CLASS AND COUNTY -CO
TONS PER WINTER DAY

6COWmobct
Oct 20 93

	COUNTIES	1 LDGV	2 LDGT1	3 LDGT2	4 HDGV	5 LDDV	6 LDDT	7 HDDV	8 MC	TOTAL
	=========	======	======	======	======	======	======	======	======	======
1	BARNSTABLE	81.497	8.572	4.723	3.158	0.044	0.004	0.634	0.656	99.288
2	BERKSHIRE	103.094	10.551	5.804	4.489	0.052	0.005	1.490	0.667	126.152
3	BRISTOL	237.901	22.911	12.638	7.761	0.114	0.010	2.262	1.178	284.775
4	DUKES	4.591	0.592	0.327	0.207	0.003	0.000	0.043	0.049	5.812
5	ESSEX	335.751	32.392	17.817	11.093	0.157	0.014	3.517	1.773	402.514
6	FRANKLIN	64.762	7.304	4.006	3.176	0.032	0.003	1.088	0.496	80.867
7	HAMPDEN	219.073	21.479	11.819	7.601	0.104	0.010	2.601	1.211	263.898
8	HAMPSHIRE	80.725	8.269	4.558	2.990	0.043	0.004	0.773	0.481	97.843
9	MIDDLESEX	652.770	62.961	34.593	21.200	0.305	0.027	6.600	3.386	781.842
10	NANTUCKET	2.006	0.316	0.175	0.124	0.001	0.000	0.023	0.033	2.678
11	NORFOLK	358.589	34.496	18.977	11.250	0.162	0.014	3.552	1.839	428.879
12	PLYMOUTH	193.801	18.730	10.298	6.838	0.092	0.008	2.001	1.090	232.858
13	SUFFOLK	147.195	13.073	7.196	4.856	0.077	0.006	1.430	0.679	174.512
14	WORCESTER	334.424	32.882	18.011	13.679	0.174	0.016	4.645	1.939	405.770
	STATE qc	2816.179	274.528	150.942	98.422	1.360	0.121	30.659	15.477	3387.688 3387.688

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                     MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO BARNSTABLE COUNTY

m5cowBAR
  10/19/93        INTER-  FREEWY PRINCIP   MINOR                           VMT      INTER PRINCIPL   MINOR   MAJOR   MINOR               VMT       VMT     TOTAL
                   STATE EXPRESS  ARTERY  ARTERY COLLECT   LOCAL         TOTAL      STATE   ARTERY  ARTERY COLLECT COLLECT   LOCAL      TOTAL     TOTAL EMISSIONS
  COUNTIES        URBAN1  URBAN2  URBAN3  URBAN4  URBAN5  URBAN6         U1-U6     RURAL1   RURAL2  RURAL3  RURAL4  RURAL5  RURAL6      R1-R6 ALL ROADS
  --------       ------- ------- ------- ------- ------- -------        ======    ------- ------- ------- ------- ------- -------    ======= ========= ========
  1 BARN ADVMT         0     243     547     286     301     572          1949          0     460     536     377      98     440       1911      3860
Winter *0.9812     0.000 238.432 536.716 280.623 295.341 561.246      1912.359      0.000 451.352 525.923 369.912  96.158 431.728   1875.073  3787.432
         SPEED    NA          60      40      35      37      27                NA             50      42      40      37      23


i   LDGV VMIX          0   85.32   85.42   84.14   84.53   84.53                    0   83.05   83.65   74.47   76.94   76.94
    SUMM ADVMT     0.000 203.430 458.463 236.116 249.652 474.422      1622.083      0.000 374.848 439.935 275.474  73.984 332.172   1496.412  3118.494
    EM.FAC G/ML        0   35.36   20.89   22.69    21.9   27.07                    0   18.95   20.32   20.89    21.9   30.34
    EMISS TPSD     0.000   7.929  10.557   5.906   6.027  14.156                0.000   7.830   9.854   6.343   1.786  11.109                         81.497

ii  LDGT1 VMIX         0    5.85    6.24    7.56    7.62    7.62                    0    7.16    7.43   12.68    9.59    9.59
    SUMM ADVMT     0.000  13.948  33.491  21.215  22.505  42.767       133.926      0.000  32.317  39.076  46.905   9.222  41.403    168.922   302.848
    EM.FAC G/ML        0    42.2    22.7    24.4   23.64   28.72                    0   21.09   22.19    22.7   23.64   31.85
    EMISS TPSD     0.000   0.649   0.838   0.571   0.586   1.354                0.000   0.751   0.956   1.174   0.240   1.454                          8.572

iii LDGT2 VMIX         0    2.98    3.18    3.85    3.88    3.88                    0    3.65    3.78    6.46    4.89    4.89
    SUMM ADVMT     0.000   7.105  17.068  10.804  11.459  21.776        68.212      0.000  16.474  19.880  23.896   4.702  21.111     86.064   154.277
    EM.FAC G/ML        0   45.57   24.49   26.44   25.38   31.26                    0   22.49   23.88   24.49   25.58   34.83
    EMISS TPSD     0.000   0.357   0.461   0.315 - 0.321   0.750         0.000      0.000   0.408   0.523   0.645   0.133   0.811                          4.723

iv  HDGV VMIX       0.00    1.46    1.31    1.32    1.00    1.00                 0.00    1.96    1.24    2.01    2.50    2.50
    SUMM ADVMT     0.000   3.481   7.031   3.704   2.953   5.612        22.782      0.000   8.846   6.521   7.435   2.404  10.793     36.000    58.783
    EM.FAC G/ML        0   52.71   41.46    44.8   43.15   56.86                    0   41.88   40.82   41.46   43.15   67.54
    EMISS TPSD     0.000   0.202   0.321   0.183   0.140   0.352                0.000   0.408   0.293   0.340   0.114   0.804                          3.158

v   LDDV VMIX       0.00    1.18    1.18    1.16    1.17    1.17                 0.00    1.15    1.15    1.03    1.06    1.06
    SUMM ADVMT     0.000   2.813   6.333   3.255   3.455   6.567        22.424      0.000   5.191   6.048   3.810   1.019   4.576     20.644    43.068
    EM.FAC G/ML        0    0.85     0.8    0.89    0.85    1.14                    0    0.76    0.78     0.8    0.85    1.36
    EMISS TPSD     0.000   0.003   0.006   0.003   0.003   0.008                0.000   0.004   0.005   0.003   0.001   0.007                          0.044

vi  LDDT VMIX       0.00    0.07    0.08    0.09    0.10    0.10                 0.00    0.09    0.09    0.16    0.12    0.12
    SUMM ADVMT     0.000   0.167   0.429   0.253   0.295   0.561         1.705      0.000   0.406   0.473   0.592   0.115   0.518      2.105     3.810
    EM.FAC G/ML        0    0.98    0.92    1.01    0.97    1.31                    0    0.86    0.89    0.92    0.97    1.55
    EMISS TPSD     0.000   0.000   0.000   0.000   0.000   0.001                0.000   0.000   0.000   0.001   0.000   0.001                          0.004

vii HDDV VMIX       0.00    2.74    2.09    1.48    1.20    1.20                 0.00    2.74    2.06    2.69    2.50    2.50
    SUMMER VMT      0.00    6.53   11.22    4.15    3.54    6.73        32.183       0.00   12.37   10.83    9.95    2.40   10.79     46.349    78.532
    EM.FAC G/ML        0    6.86    6.46    7.31    6.82    9.18                    0    6.08    6.29    6.46    6.82   10.88
    EMISS TPSD     0.000   0.049   0.080   0.033   0.027   0.068                0.000   0.083   0.075   0.071   0.018   0.129                          0.634

iix MC VMIX         0.00    0.40    0.50    0.40    0.50    0.50                 0.00    0.20    0.60    0.50    2.40    2.40
    SUMM ADVMT      0.00    0.95    2.68    1.12    1.48    2.81         9.043       0.00    0.90    3.16    1.85    2.31   10.36     18.577    27.620
    EM.FAC G/ML     0.00   28.63   15.23   17.68   16.59   23.80                 0.00   12.99   14.51   15.23   16.59   28.17
    EMISS TPSD     0.000   0.030   0.045   0.022   0.027   0.074                0.000   0.013   0.050   0.031   0.042   0.322                          0.656

                                                                                                              COUNTY TOTAL      3787.432    99.289
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              MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO BERKSHIRE COUNTY

m5cowBK6a
  10/18/93       INTER-   FREEWY  PRINCIP    MINOR                           VMT     INTER PRINCIPL   MINOR    MAJOR    MINOR                 VMT        VMT     TOTAL
                  STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL       TOTAL     STATE   ARTERY   ARTERY  COLLECT  COLLECT    LOCAL     TOTAL      TOTAL EMISSIONS
  COUNTIES       URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6       U1-U6    RURAL1   RURAL2   RURAL3   RURAL4   RURAL5   RURAL6     R1-R6  ALL ROADS
  --------      -------  -------  -------  -------  -------  -------      ======   -------  -------  -------  -------  -------  -------   =======  =========  ========
 1  ADVMT             0      398      422      228      252      279        1579       825     1009      669      446      137      295      3381       4960
Winter *0.9812    0.000  390.518  414.066  223.714  247.262  273.755    1549.315   809.490  990.031  656.423  437.615  134.424  289.454  3317.437   4866.752
         SPEED       NA       48       39       40       39       20                    60       53       38       40       33       29


i   LDGV VMIX         0    85.32    85.42    84.14    84.53    84.53                 73.98    83.05    83.65    74.47    76.94    76.94
    SUMM ADVMT    0.000  333.190  353.696  188.233  209.011  231.405    1315.534   598.861  822.221  549.098  325.892  103.426  222.706  2622.203   3937.737
    EM.FAC G/ML       0    18.95    21.21    20.89    21.21    33.58                 35.36    18.95    21.55    20.89    23.59    25.76
    EMISS TPSD    0.000    6.960    8.269    4.334    4.887    8.566                23.342   17.175   13.044    7.504    2.689    6.324                        103.094

ii  LDGT1 VMIX        0     5.85     6.24     7.56     7.62     7.62                  5.78     7.16     7.43    12.68     9.59     9.59
    SUMM ADVMT    0.000   22.845   25.838   16.913   18.841   20.860     105.297    46.789   70.886   48.772   55.490   12.891   27.759   262.586    367.884
    EM.FAC G/ML       0    21.09    22.99     22.7    22.99    34.84                  42.2    21.09     23.3     22.7    25.27    27.42
    EMISS TPSD    0.000    0.531    0.655    0.423    0.477    0.801                 2.176    1.648    1.253    1.388    0.359    0.839                         10.551

iii LDGT2 VMIX        0     2.98     3.18     3.85     3.88     3.88                  2.95     3.65     3.78     6.46     4.89     4.89
    SUMM ADVMT    0.000   11.637   13.167    8.613    9.594   10.622      53.633    23.880   36.136   24.813   28.270    6.573   14.154   133.826    187.460
    EM.FAC G/ML       0    22.49    24.82    24.49    24.82    38.35                 45.57    22.49    25.19    24.49    27.42    29.82
    EMISS TPSD    0.000    0.289    0.360    0.233    0.262    0.449       0.000     1.200    0.896    0.689    0.763    0.199    0.465                          5.804

iv  HDGV VMIX      0.00     1.46     1.31     1.32     1.00     1.00                  2.51     1.96     1.24     2.01     2.50     2.50
    SUMM ADVMT    0.000    5.702    5.424    2.953    2.473    2.738      19.289    20.318   19.405    8.140    8.796    3.361    7.236    67.255     86.544
    EM.FAC G/ML       0    41.07    41.92    41.46    41.92    78.63                 52.71    43.85    42.49    41.46    46.93    52.37
    EMISS TPSD    0.000    0.258    0.251    0.135    0.114    0.237                 1.181    0.938    0.381    0.402    0.174    0.418                          4.489

v   LDDV VMIX      0.00     1.18     1.18     1.16     1.17     1.17                  1.02     1.15     1.15     1.03     1.06     1.06
    SUMM ADVMT    0.000    4.608    4.886    2.595    2.893    3.203      18.185     8.257   11.385    7.549    4.507    1.425    3.068    36.192     54.377
    EM.FAC G/ML       0     0.76     0.82      0.8     0.82     1.57                  0.85     0.77     0.83      0.8     0.94     1.06
    EMISS TPSD    0.000    0.004    0.004    0.002    0.003    0.006                 0.008    0.010    0.007    0.004    0.001    0.004                          0.052

vi  LDDT VMIX      0.00     0.07     0.08     0.09     0.10     0.10                  0.07     0.09     0.09     0.16     0.12     0.12
    SUMM ADVMT    0.000    0.273    0.331    0.201    0.247    0.274       1.327     0.567    0.891    0.591    0.700    0.161    0.347     3.257      4.584
    EM.FAC G/ML       0     0.86     0.93     0.92     0.93     1.79                  0.98     0.88     0.95     0.92     1.07     1.21
    EMISS TPSD    0.000    0.000    0.000    0.000    0.000    0.001                 0.001    0.001    0.001    0.001    0.000    0.000                          0.005

vii HDDV VMIX      0.00     2.74     2.09     1.48     1.20     1.20                 13.09     2.74     2.06     2.69     2.50     2.50
    SUMMER VMT     0.00    10.70     8.65     3.31     2.97     3.29      28.917    105.96    27.13    13.52    11.77     3.36     7.24   168.980    197.898
    EM.FAC G/ML       0     6.06     6.57     6.46     6.57     12.6                  6.86     6.18     6.68     6.46     7.51     8.53
    EMISS TPSD    0.000    0.071    0.063    0.024    0.021    0.046                 0.801    0.185    0.100    0.084    0.028    0.068                          1.490

iix MC VMIX        0.00     0.40     0.50     0.40     0.50     0.50                  0.60     0.20     0.60     0.50     2.40     2.40
    SUMM ADVMT     0.00     1.56     2.07     0.89     1.24     1.37       7.132      4.86     1.98     3.94     2.19     3.23     6.95    23.137     30.269
    EM.FAC G/ML    0.00    12.99    15.65    15.23    15.65    32.42                 28.63    12.99    16.10    15.23    18.94    21.99
    EMISS TPSD    0.000    0.022    0.036    0.015    0.021    0.049                 0.153    0.028    0.070    0.037    0.067    0.168                          0.667

                                                                                                                     COUNTY TOTAL          4866.752   126.153
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                    MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY - CO BRISTOL COUNTY

m5cowBRI6a
  10/19/93    INTER-   FREEWY  PRINCIP    MINOR                           VMT       INTER PRINCIPL   MINOR   MAJOR   MINOR                VMT        VMT    TOTAL
               STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL       TOTAL       STATE   ARTERY  ARTERY COLLECT COLLECT    LOCAL     TOTAL      TOTAL EMISSIONS
  COUNTIES    URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6       U1-U6     RURAL1   RURAL2  RURAL3  RURAL4  RURAL5   RURAL6     R1-R6  ALL ROADS
  --------   -------  -------  -------  -------  -------  -------      ======     ------- ------- ------- ------- ------- -------   ======= ========= ========
 1  ADVMT       2900     1487     1780     1430      969     1467       10033           0     207      70     221      40      84       622     10655
Winter*0.9812 2845.480 1459.044 1746.536 1403.116 950.783 1439.420   9844.380       0.000 203.108  68.684 216.845  39.248  82.421   610.306 10454.686
       SPEED      59       50       42       32       33       31                    NA      58      40      39      34      36


i   LDGV VMIX     80    85.32    85.42    84.14    84.53    84.53                       0   83.05   83.65   74.47   76.94   76.94
  SUMM ADVMT 2276.384 1244.857 1491.891 1180.582 803.697 1216.742   8214.152       0.000 168.682  57.454 161.485  30.197  63.415   481.232  8695.385
  EM.FAC G/ML  32.07    18.95    20.32    24.08    23.59     24.6                       0   28.79   20.89   21.21   23.13   22.29
  EMISS TPSD  80.472   26.003   33.416   31.337   20.899   32.994                   0.000   5.353   1.323   3.775   0.770   1.558                         237.901

ii  LDGT1 VMIX   7.1     5.85     6.24     7.56     7.62     7.62                       0    7.16    7.43   12.68    9.59    9.59
  SUMM ADVMT 202.029   85.354  108.984  106.076   72.450  109.684    684.576       0.000  14.543   5.103  27.496   3.764   7.904    58.810   743.386
  EM.FAC G/ML  37.98    21.09    22.19    25.06    25.27    26.28                       0   33.76    22.7   22.99   24.82      24
  EMISS TPSD   8.458    1.984    2.666    2.930    2.018    3.177                   0.000   0.541   0.128   0.697   0.103   0.209                          22.911

iii LDGT2 VMIX  3.61     2.98     3.18     3.85     3.88     3.88                       0    3.65    3.78    6.46    4.89    4.89
  SUMM ADVMT 102.722   43.480   55.540   54.020   36.890   55.850    348.501       0.000   7.413   2.596  14.008   1.919   4.030    29.968   378.469
  EM.FAC G/ML  40.96    22.49    23.88    27.97    27.42    28.54                       0   36.34   24.49   24.82   26.92   25.99
  EMISS TPSD   4.638    1.078    1.462    1.666  - 1.115    1.757      0.000       0.000   0.297   0.070   0.383   0.057   0.115                          12.638

iv  HDGV VMIX   1.80     1.46     1.31     1.32     1.00     1.00                    0.00    1.96    1.24    2.01    2.50    2.50
  SUMM ADVMT  51.219   21.302   22.880   18.521    9.508   14.394    137.823       0.000   3.981   0.852   4.359   0.981   2.061    12.233   150.056
  EM.FAC G/ML     51    41.88    40.82    48.19    46.93    49.59                       0   49.46   41.46   41.92    45.8   43.92
  EMISS TPSD   2.879    0.983    1.029    0.984    0.492    0.787                   0.000   0.217   0.039   0.201   0.050   0.100                           7.761

v   LDDV VMIX   1.10     1.18     1.18     1.16     1.17     1.17                    0.00    1.15    1.15    1.03    1.06    1.06
  SUMM ADVMT  31.300   17.217   20.609   16.276   11.124   16.841    113.368       0.000   2.336   0.790   2.234   0.416   0.874     6.649   120.016
  EM.FAC G/ML   0.84     0.76     0.78     0.96     0.94     0.99                       0    0.82     0.8    0.82    0.91    0.87
  EMISS TPSD   0.029    0.014    0.018    0.017    0.012    0.018                   0.000   0.002   0.001   0.002   0.000   0.001                           0.114

vi  LDDT VMIX   0.09     0.07     0.08     0.09     0.10     0.10                    0.00    0.09    0.09    0.16    0.12    0.12
  SUMM ADVMT   2.561    1.021    1.397    1.263    0.951    1.439      8.632       0.000   0.183   0.062   0.347   0.047   0.099     0.738     9.370
  EM.FAC G/ML   0.96     0.86     0.89      1.1     1.07     1.13                       0    0.94    0.92    0.93    1.04    0.99
  EMISS TPSD   0.003    0.001    0.001    0.002    0.001    0.002                   0.000   0.000   0.000   0.000   0.000   0.000                           0.010

vii HDDV VMIX   5.70     2.74     2.09     1.48     1.20     1.20                    0.00    2.74    2.06    2.69    2.50    2.50
  SUMMER VMT  162.19    39.98    36.50    20.77    11.41    17.27    288.121        0.00    5.57    1.41    5.83    0.98    2.06    15.855   303.976
  EM.FAC G/ML   6.72     6.08     6.29     7.73     7.51     7.97                       0     6.6    6.46    6.57    7.31    6.97
  EMISS TPSD   1.201    0.268    0.253    0.177    0.094    0.152                   0.000   0.040   0.010   0.042   0.008   0.016                           2.262

iix MC VMIX     0.60     0.40     0.50     0.40     0.50     0.50                    0.00    0.20    0.60    0.50    2.40    2.40
  SUMM ADVMT   17.07     5.84     8.73     5.61     4.75     7.20     49.205        0.00    0.41    0.41    1.08    0.94    1.98     4.823    54.028
  EM.FAC G/ML  25.50    12.99    14.51    19.64    18.94    20.38                    0.00   22.38   15.23   15.65   18.29   17.12
  EMISS TPSD   0.480    0.084    0.140    0.122    0.099    0.162                   0.000   0.010   0.007   0.019   0.019   0.037                           1.178

                                                                                                                     COUNTY TOTAL     10454.686  284.776
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                        MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO DUKES COUNTY

 m5cowDUK6a
   10/20/93     INTER-   FREEWY  PRINCIP    MINOR                             VMT      INTER PRINCIPL   MINOR   MAJOR   MINOR                VMT       VMT    TOTAL
                 STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL         TOTAL      STATE   ARTERY  ARTERY COLLECT COLLECT    LOCAL     TOTAL     TOTAL EMISSIONS
   COUNTIES     URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6         U1-U6     RURAL1   RURAL2  RURAL3  RURAL4  RURAL5   RURAL6     R1-R6 ALL ROADS
   ---------   -------  -------  -------  -------  -------  -------        ======    -------  ------- ------- ------- -------  -------   ======= ========= ========
  1  ADVMT           0        0        0        0        0        0             0          0        0     105      73      28       26       232       232
 WINTER *.9812   0.000    0.000    0.000    0.000    0.000    0.000         0.000      0.000    0.000 103.026  71.628  27.474   25.511   227.638   227.638
         SPEED      NA       NA       NA       NA       NA       NA                       NA       NA      34      39      32       27


 i   LDGV VMIX       0        0        0        0        0        0                        0        0   83.65   74.47   76.94    76.94
    SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000         0.000      0.000    0.000  86.181  53.341  21.138   19.628   180.289   180.289
    EM.FAC G/ML      0        0        0        0        0        0             0          0        0   23.13   21.21   24.08    27.07
    EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                    0.000    0.000   2.197   1.247   0.561    0.586                          4.591

 ii  LDGT1 VMIX      0        0        0        0        0        0                        0        0    7.43   12.68    9.59     9.59
    SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000         0.000      0.000    0.000   7.655   9.082   2.635    2.447    21.818    21.818
    EM.FAC G/ML      0        0        0        0        0        0                        0        0   24.82   22.99   25.76    28.72
    EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                    0.000    0.000   0.209   0.230   0.075    0.077                          0.592

 iii LDGT2 VMIX      0        0        0        0        0        0                        0        0    3.78    6.46    4.89     4.89
    SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000         0.000      0.000    0.000   3.894   4.627   1.343    1.247    11.112    11.112
    EM.FAC G/ML      0        0        0        0        0        0                        0        0   26.92   24.82   27.97    31.26
    EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000         0.000      0.000    0.000   0.116   0.127   0.041    0.043                          0.327

 iv  HDGV VMIX    0.00     0.00     0.00     0.00     0.00     0.00                     0.00     0.00    1.24    2.01    2.50     2.50
    SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000         0.000      0.000    0.000   1.278   1.440   0.687    0.638     4.042     4.042
    EM.FAC G/ML      0        0        0        0        0        0                        0        0    45.8   41.92   48.19    56.86
    EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                    0.000    0.000   0.064   0.067   0.036    0.040                          0.207

 v   LDDV VMIX    0.00     0.00     0.00     0.00     0.00     0.00                     0.00     0.00    1.15    1.03    1.06     1.06
    SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000         0.000      0.000    0.000   1.185   0.738   0.291    0.270     2.484     2.484
    EM.FAC G/ML      0        0        0        0        0        0                        0        0    0.91    0.82    0.96     1.14
    EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                    0.000    0.000   0.001   0.001   0.000    0.000                          0.003

 vi  LDDT VMIX    0.00     0.00     0.00     0.00     0.00     0.00                     0.00     0.00    0.09    0.16    0.12     0.12
    SUMM ADVMT   0.000    0.000    0.000    0.000    0.000    0.000         0.000      0.000    0.000   0.093   0.115   0.033    0.031     0.271     0.271
    EM.FAC G/ML      0        0        0        0        0        0                        0        0    1.04    0.93     1.1     1.31
    EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                    0.000    0.000   0.000   0.000   0.000    0.000                          0.000

 vii HDDV VMIX    0.00     0.00     0.00     0.00     0.00     0.00          0.00       0.00     0.00    2.06    2.69    2.50     2.50
    SUMMER VMT    0.00     0.00     0.00     0.00     0.00     0.00         0.000       0.00     0.00    2.12    1.93    0.69     0.64     5.374     5.374
    EM.FAC G/ML      0        0        0        0        0        0                        0        0    7.31    6.57    7.73     9.18
    EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                    0.000    0.000   0.017   0.014   0.006    0.006                          0.043

 iix MC VMIX      0.00     0.00     0.00     0.00     0.00     0.00                     0.00     0.00    0.60    0.50    2.40     2.40
    SUMM ADVMT    0.00     0.00     0.00     0.00     0.00     0.00         0.000       0.00     0.00    0.62    0.36    0.66     0.61     2.248     2.248
    EM.FAC G/ML   0.00     0.00     0.00     0.00     0.00     0.00                     0.00     0.00   18.29   15.65   19.64    23.80
    EMISS TPSD   0.000    0.000    0.000    0.000    0.000    0.000                    0.000    0.000   0.012   0.006   0.014    0.016                          0.049

                                                                                                                       COUNTY TOTAL       227.6384    5.812
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               MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO ESSEX COUNTY

m5coWESX6a
   10/20/93     INTER-   FREEWY  PRINCIP    MINOR                          VMT      INTER PRINCIPL    MINOR    MAJOR    MINOR                  VMT        VMT     TOTAL
                 STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL      TOTAL      STATE   ARTERY   ARTERY  COLLECT  COLLECT    LOCAL      TOTAL      TOTAL EMISSIONS
   COUNTIES     URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6      U1-U6     RURAL1   RURAL2   RURAL3   RURAL4   RURAL5   RURAL6      R1-R6  ALL ROADS   CO TPWD
   --------    -------  -------  -------  -------  -------  -------     ======    -------  -------  -------  -------  -------  -------    =======  =========  ========
  1  ADVMT        4020     1852     2765     1865      836     1769      13107        442      110      255      217       27      121       1172      14279
Winter *.9812 3944.424 1817.182 2713.018 1829.938  820.283 1735.743  12860.588    433.690  107.932  250.206  212.920   26.492  118.725   1149.966  14010.555
        SPEED       60       48       42       33       36       25                  59       50       50       40       33       20


i    LDGV VMIX      80    85.32    85.42    84.14    84.53    84.53                 73.98    83.05    83.65    74.47    76.94    76.94
   SUMM ADVMT 3155.539 1550.420 2317.460 1539.710  693.385 1467.223  10723.738    320.844   89.638  209.297  158.562   20.383   91.347    890.071  11613.809
   EM.FAC G/ML   35.36    18.95    20.32    23.59    22.29    28.59                 32.07    18.95    18.95    20.89    23.59    33.58
   EMISS TPSD  122.994   32.386   51.908   40.037   17.037   46.239                11.342    1.872    4.372    3.651    0.530    3.381                          335.751

ii   LDGT1 VMIX    7.1     5.85     6.24     7.56     7.62     7.62                  5.78     7.16     7.43    12.68     9.59     9.59
   SUMM ADVMT  280.054  106.305  169.292  138.343   62.506  132.264    888.764     25.067    7.728   18.590   26.998    2.541   11.386     92.310    981.074
   EM.FAC G/ML    42.2    21.09    22.19    25.27       24    30.18                 37.98    21.09    21.09     22.7    25.27    34.84
   EMISS TPSD   13.027    2.471    4.141    3.854    1.654    4.400                 1.049    0.180    0.432    0.676    0.071    0.437                           32.392

iii  LDGT2 VMIX   3.61     2.98     3.18     3.85     3.88     3.88                  2.95     3.65     3.78     6.46     4.89     4.89
   SUMM ADVMT  142.394   54.152   86.274   70.453   31.827   67.347    452.446     12.794    3.940    9.458   13.755    1.295    5.806     47.047    499.493
   EM.FAC G/ML   45.57    22.49    23.88    27.42    25.99    32.92                 40.96    22.49    22.49    24.49    27.42    38.35
   EMISS TPSD    7.153    1.342    2.271    2.129    0.912    2.444      0.000      0.578    0.098    0.234    0.371    0.039    0.245                           17.817

iv   HDGV VMIX    1.80     1.46     1.31     1.32     1.00     1.00                  2.51     1.96     1.24     2.01     2.50     2.50
   SUMM ADVMT   71.000   26.531   35.541   24.155    8.203   17.357    182.786     10.886    2.115    3.103    4.280    0.662    2.968     24.014    206.800
   EM.FAC G/ML   52.71    41.07    40.82    46.93    43.92     61.7                    51    41.88    41.88    41.46    46.93    78.63
   EMISS TPSD    4.125    1.201    1.599    1.250    0.397    1.181                 0.612    0.098    0.143    0.196    0.034    0.257                           11.093

v    LDDV VMIX    1.10     1.18     1.18     1.16     1.17     1.17                  1.02     1.15     1.15     1.03     1.06     1.06
   SUMM ADVMT   43.389   21.443   32.014   21.227    9.597   20.308    147.978      4.424    1.241    2.877    2.193    0.281    1.258     12.275    160.252
   EM.FAC G/ML    0.85     0.76     0.78     0.94     0.87     1.24                  0.84     0.76     0.76      0.8     0.94     1.57
   EMISS TPSD    0.041    0.018    0.028    0.022    0.009    0.028                 0.004    0.001    0.002    0.002    0.000    0.002                            0.157

vi   LDDT VMIX    0.09     0.07     0.08     0.09     0.10     0.10                  0.07     0.09     0.09     0.16     0.12     0.12
   SUMM ADVMT    3.550    1.272    2.170    1.647    0.820    1.736     11.195      0.304    0.097    0.225    0.341    0.032    0.142      1.141     12.336
   EM.FAC G/ML    0.98     0.86     0.89     1.07     0.99     1.42                  0.96     0.86     0.86     0.92     1.07     1.79
   EMISS TPSD    0.004    0.001    0.002    0.002    0.001    0.003                 0.000    0.000    0.000    0.000    0.000    0.000                            0.014

vii  HDDV VMIX    5.70     2.74     2.09     1.48     1.20     1.20                 13.09     2.74     2.06     2.69     2.50     2.50
   SUMMER VMT   224.83    49.79    56.70    27.08     9.84    20.83    389.080      56.77     2.96     5.15     5.73     0.66     2.97     74.240    463.320
   EM.FAC G/ML    6.86     6.06     6.29     7.51     6.97     9.96                  6.72     6.08     6.08     6.46     7.51     12.6
   EMISS TPSD    1.700    0.333    0.393    0.224    0.076    0.229                 0.421    0.020    0.035    0.041    0.005    0.041                            3.517

iix  MC VMIX      0.60     0.40     0.50     0.40     0.50     0.50                  0.60     0.20     0.60     0.50     2.40     2.40
   SUMM ADVMT    23.67     7.27    13.57     7.32     4.10     8.68     64.600       2.60     0.22     1.50     1.06     0.64     2.85      8.869     73.469
   EM.FAC G/ML   28.63    12.57    14.51    18.94    17.12    25.84                 25.50    12.99    12.99    15.23    18.94    32.42
   EMISS TPSD    0.747    0.101    0.217    0.153    0.077    0.247                 0.073    0.003    0.021    0.018    0.013    0.102                            1.773

                                                                                                                    COUNTY TOTAL         14010.554   402.513
                 MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO FRANKLIN COUNTY

m5cowFRA
  10/20/93          INTER-    FREEWY   PRINCIP     MINOR                             VMT     INTER  PRINCIPL     MINOR     MAJOR     MINOR                 VMT       VMT     TOTAL
                     STATE   EXPRESS    ARTERY    ARTERY   COLLECT     LOCAL     TOTAL     STATE    ARTERY    ARTERY   COLLECT   COLLECT     LOCAL     TOTAL     TOTAL EMISSIONS
  COUNTIES          URBAN1    URBAN2    URBAN3    URBAN4    URBAN5    URBAN6     U1-U6    RURAL1    RURAL2    RURAL3    RURAL4    RURAL5    RURAL6     R1-R6 ALL ROADS   CO TPWD
  --------         -------   -------   -------   -------   -------   -------    ======   -------   -------   -------   -------   -------   -------   ======= =========  ========
  1 ADVMT              209        54        86        88        49        76       562       614       675       473       542       116       343      2763      3325
WINTER *.9812      205.071    52.985    84.383    86.346    48.079    74.571   551.434   602.457   662.310   464.108   531.810   113.819   336.552  2711.056  3262.490
           SPEED        58        48        36        32        34        33                  58        48        44        43        35        30


i   LDGV VMIX           80     85.32     85.42     84.14     84.53     84.53               73.98     83.05     83.65     74.47     76.94     76.94
    SUMM ADVMT     164.057    45.207    72.080    72.651    40.641    63.035   457.671   445.698   550.048   388.226   396.039    87.572   258.943  2126.527  2584.197
    EM.FAC G/ML      28.79     18.95     22.29     24.08     23.13     23.59               28.79     18.95     19.81     20.05     22.69     25.16
    EMISS TPSD       5.206     0.944     1.771     1.928     1.036     1.639              14.144    11.490     8.478     8.753     2.190     7.181                        64.762

ii  LDGT1 VMIX         7.1      5.85      6.24      7.56      7.62      7.62                5.78      7.16      7.43     12.68      9.59      9.59
    SUMM ADVMT      14.560     3.100     5.266     6.528     3.664     5.682    38.799    34.822    47.421    34.483    67.434    10.915    32.275   227.351   266.150
    EM.FAC G/ML      33.76     21.09        24     25.76     24.82     25.27               33.76     21.09     21.76     21.97      24.4     26.83
    EMISS TPSD       0.542     0.072     0.139     0.185     0.100     0.158               1.296     1.102     0.827     1.633     0.294     0.955                         7.304

iii LDGT2 VMIX        3.61      2.98      3.18      3.85      3.88      3.88                2.95      3.65      3.78      6.46      4.89      4.89
    SUMM ADVMT       7.403     1.579     2.683     3.324     1.865     2.893    19.749    17.772    24.174    17.543    34.355     5.566    16.457   115.868   135.617
    EM.FAC G/ML      36.34     22.49     25.99     27.97     26.92     27.42               36.34     22.49     23.35     23.61     26.44     29.16
    EMISS TPSD       0.297     0.039     0.077     0.102     0.055     0.087     0.000     0.712     0.599     0.452     0.894     0.162     0.529                         4.006

iv  HDGV VMIX         1.80      1.46      1.31      1.32      1.00      1.00                2.51      1.96      1.24      2.01      2.50      2.50
    SUMM ADVMT       3.691     0.774     1.105     1.140     0.481     0.746     7.937    15.122    12.981     5.755    10.689     2.845     8.414    55.807    63.743
    EM.FAC G/ML      49.46     41.07     43.92     48.19      45.8     46.93               49.46     41.07     40.54     40.64      44.8     51.15
    EMISS TPSD       0.201     0.035     0.054     0.061     0.024     0.039               0.824     0.588     0.257     0.479     0.141     0.474                         3.176

v   LDDV VMIX         1.10      1.18      1.18      1.16      1.17      1.17                1.02      1.15      1.15      1.03      1.06      1.06
    SUMM ADVMT       2.256     0.625     0.996     1.002     0.563     0.872     6.313     6.145     7.617     5.337     5.478     1.206     3.567    29.350    35.664
    EM.FAC G/ML       0.82      0.76      0.87      0.96      0.91      0.94                0.82      0.76      0.77      0.78      0.89      1.03
    EMISS TPSD       0.002     0.001     0.001     0.001     0.001     0.001               0.006     0.006     0.005     0.005     0.001     0.004                         0.032

vi  LDDT VMIX         0.09      0.07      0.08      0.09      0.10      0.10                0.07      0.09      0.09      0.16      0.12      0.12
    SUMM ADVMT       0.185     0.037     0.068     0.078     0.048     0.075     0.490     0.422     0.596     0.418     0.851     0.137     0.404     2.827     3.316
    EM.FAC G/ML       0.94      0.86      0.99       1.1      1.04      1.07                0.94      0.86      0.88      0.88      1.01      1.17
    EMISS TPSD       0.000     0.000     0.000     0.000     0.000     0.000               0.000     0.001     0.000     0.001     0.000     0.001                         0.003

vii HDDV VMIX         5.70      2.74      2.09      1.48      1.20      1.20               13.09      2.74      2.06      2.69      2.50      2.50
    SUMMER VMT       11.69      1.45      1.76      1.28      0.58      0.89    17.654     78.86     18.15      9.56     14.31      2.85      8.41   132.134   149.789
    EM.FAC G/ML        6.6      6.06      6.97      7.73      7.31      7.51                 6.6      6.06      6.17      6.22      7.13      8.24
    EMISS TPSD       0.085     0.010     0.014     0.011     0.005     0.007               0.574     0.121     0.065     0.098     0.022     0.076                         1.088

iix MC VMIX           0.60      0.40      0.50      0.40      0.50      0.50                0.60      0.20      0.60      0.50      2.40      2.40
    SUMM ADVMT        1.23      0.21      0.42      0.35      0.24      0.37     2.823      3.61      1.32      2.78      2.66      2.73      8.08    21.192    24.015
    EM.FAC G/ML      22.38     12.99     17.12     19.64     18.29     18.94               22.38     12.99     13.91     14.19     17.68     21.16
    EMISS TPSD       0.030     0.003     0.008     0.007     0.005     0.008               0.089     0.019     0.043     0.042     0.053     0.188                         0.496

                                                                                                                            COUNTY TOTAL         3262.49    80.867
                     MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO HAMPDEN COUNTY

m5cowHMD6a
  10/20/93       INTER-   FREEWY  PRINCIP    MINOR                        VMT      INTER PRINCIPL    MINOR    MAJOR    MINOR                 VMT       VMT     TOTAL
                  STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL    TOTAL      STATE   ARTERY   ARTERY  COLLECT  COLLECT    LOCAL    TOTAL     TOTAL EMISSIONS
  COUNTIES       URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6    U1-U6     RURAL1   RURAL2   RURAL3   RURAL4   RURAL5   RURAL6    R1-R6 ALL ROADS   CO TPWD
  ---------     -------  -------  -------  -------  -------  -------   ======    -------  -------  -------  -------  -------  -------  ======= =========  ========
 1 BARN ADVMT      2159      178     2361     1517      573     1113     7901        833        0      343      354       57      173     1760      9661
WINTER *.9812  2118.411  174.654 2316.613 1488.480  562.228 1092.076 7752.461    817.340    0.000  336.552  347.345   55.928  169.748 1726.912  9479.373
        SPEED        59       44       42       39       37       24                  60       NA       42       37       36       29


i   LDGV VMIX        80    85.32    85.42    84.14    84.53    84.53               73.98        0    83.65    74.47    76.94    76.94
   SUMM ADVMT  1694.729  149.014 1978.851 1252.407  475.251  923.132 6473.384    604.668    0.000  281.525  258.668   43.031  130.604 1318.496  7791.880
   EM.FAC G/ML    32.07    19.81    20.32    21.21     21.9    29.43               35.36        0    20.32     21.9    22.29    25.76
   EMISS TPSD    59.910    3.254   44.324   29.281   11.473   29.947              23.568    0.000    6.306    6.244    1.057    3.709                      219.073

ii  LDGT1 VMIX      7.1     5.85     6.24     7.56     7.62     7.62                5.78        0     7.43    12.68     9.59     9.59
   SUMM ADVMT   150.407   10.217  144.557  112.529   42.842   83.216  543.768     47.242    0.000   25.006   44.043    5.364   16.279  137.934   681.702
   EM.FAC G/ML    37.98    21.76    22.19    22.99    23.64    30.99                42.2        0    22.19    23.64       24    27.42
   EMISS TPSD     6.297    0.245    3.536    2.852    1.116    2.843               2.198    0.000    0.612    1.148    0.142    0.492                       21.479

iii LDGT2 VMIX     3.61     2.98     3.18     3.85     3.88     3.88                2.95        0     3.78     6.46     4.89     4.89
   SUMM ADVMT    76.475    5.205   73.668   57.306   21.814   42.373  276.841     24.112    0.000   12.722   22.438    2.735    8.301   70.307   347.148
   EM.FAC G/ML    40.96    23.35    23.88    24.82    25.58    33.84               45.57        0    23.88    25.58    25.99    29.82
   EMISS TPSD     3.453    0.134    1.939    1.568    0.615    1.581    0.000      1.211    0.000    0.335    0.633    0.078    0.273                       11.819

iv  HDGV VMIX      1.80     1.46     1.31     1.32     1.00     1.00                2.51     0.00     1.24     2.01     2.50     2.50
   SUMM ADVMT    38.131    2.550   30.348   19.648    5.622   10.921  107.220     20.515    0.000    4.173    6.982    1.398    4.244   37.312   144.532
   EM.FAC G/ML       51    40.54    40.82    41.92    43.15    64.48               52.71        0    40.82    43.15    43.92    52.87
   EMISS TPSD     2.144    0.114    1.366    0.908    0.267    0.776               1.192    0.000    0.188    0.332    0.068    0.247                        7.601

v   LDDV VMIX      1.10     1.18     1.18     1.16     1.17     1.17                1.02     0.00     1.15     1.03     1.06     1.06
   SUMM ADVMT    23.303    2.061   27.336   17.266    6.578   12.777   89.321      8.337    0.000    3.870    3.578    0.593    1.799   18.177   107.498
   EM.FAC G/ML     0.84     0.77     0.78     0.82     0.85      1.3                0.85        0     0.78     0.85     0.87     1.06
   EMISS TPSD     0.022    0.002    0.024    0.016    0.006    0.018               0.008    0.000    0.003    0.003    0.001    0.002                        0.104

vi  LDDT VMIX      0.09     0.07     0.08     0.09     0.10     0.10                0.07     0.00     0.09     0.16     0.12     0.12
   SUMM ADVMT     1.907    0.122    1.853    1.340    0.562    1.092    6.876      0.572    0.000    0.303    0.556    0.067    0.204    1.702     8.578
   EM.FAC G/ML     0.96     0.88     0.89     0.93     0.97     1.48                0.98        0     0.89     0.97     0.99     1.21
   EMISS TPSD     0.002    0.000    0.002    0.001    0.001    0.002               0.001    0.000    0.000    0.001    0.000    0.000                        0.010

vii HDDV VMIX      5.70     2.74     2.09     1.48     1.20     1.20               13.09     0.00     2.06     2.69     2.50     2.50
   SUMMER VMT    120.75     4.79    48.42    22.03     6.75    13.10  215.833     106.99     0.00     6.93     9.34     1.40     4.24  128.908   344.741
   EM.FAC G/ML     6.72     6.17     6.29     6.57     6.82     10.4                6.86        0     6.29     6.82     6.97     8.53
   EMISS TPSD     0.894    0.033    0.336    0.160    0.051    0.150               0.809    0.000    0.048    0.070    0.011    0.040                        2.601

iix MC VMIX        0.60     0.40     0.50     0.40     0.50     0.50                0.60     0.00     0.60     0.50     2.40     2.40
   SUMM ADVMT     12.71     0.70    11.58     5.95     2.81     5.46   39.218       4.90     0.00     2.02     1.74     1.34     4.07   14.076    53.294
   EM.FAC G/ML    25.50    13.91    14.51    15.65    16.59    26.77               28.63     0.00    14.51    16.59    17.12    21.99
   EMISS TPSD     0.357    0.011    0.185    0.103    0.051    0.161               0.155    0.000    0.032    0.032    0.025    0.099                        1.211

                                                                                                                         COUNTY TOTAL        9479.3732   263.899
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                    MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO HAMPSHIRE COUNTY

 m5cowHMS6a
   10/20/93     INTER-  FREEWY  PRINCIP   MINOR                         VMT     INTER PRINCIPL  MINOR   MAJOR   MINOR               VMT       VMT    TOTAL
                 STATE EXPRESS  ARTERY   ARTERY COLLECT   LOCAL       TOTAL     STATE  ARTERY  ARTERY COLLECT COLLECT   LOCAL     TOTAL     TOTAL EMISSIONS
   COUNTIES     URBAN1  URBAN2  URBAN3   URBAN4  URBAN5  URBAN6       U1-U6    RURAL1  RURAL2  RURAL3  RURAL4  RURAL5  RURAL6     R1-R6 ALL ROADS   CO TPWD
   --------    -------  ------- -------  ------- ------- -------     ======   ------- ------- ------- ------- ------- -------   ======= ========= ========
  1  ADVMT         270     117     764      556     155     294        2156       128     324     502     361      75     218      1608      3764
 WINTER *.9812 264.924 114.800 749.637  545.547 152.086 288.473    2115.467   125.594 317.909 492.562 354.213  73.590 213.902  1577.770  3693.237
        SPEED       59      46      35       32      28      20                    59      46      43      33      39      37


 i   LDGV VMIX      80   85.32   85.42    84.14   84.53   84.53                 73.98   83.05   83.65   74.47   76.94   76.94
   SUMM ADVMT  211.939  97.948 640.340  459.023 128.558 243.846    1781.654    92.914 264.023 412.028 263.783  56.620 164.576  1253.944  3035.599
   EM.FAC G/ML   32.07   19.35   22.69    24.08   26.39   33.58                 32.07   19.35   20.05   23.59   21.21    21.9
   EMISS TPSD    7.492   2.089  16.016   12.184   3.740   9.026                 3.285   5.631   9.106   6.859   1.324   3.973                       80.725

 ii  LDGT1 VMIX    7.1    5.85    6.24     7.56    7.62    7.62                  5.78    7.16    7.43   12.68    9.59    9.59
   SUMM ADVMT   18.810   6.716  46.777   41.243  11.589  21.982     147.117     7.259  22.762  36.597  44.914   7.057  20.513   139.104   286.220
   EM.FAC G/ML   37.98    21.4    24.4    25.76   28.05   34.84                 37.98    21.4   21.97   25.27   22.99   23.64
   EMISS TPSD    0.787   0.158   1.258    1.171   0.358   0.844                 0.304   0.537   0.886   1.251   0.179   0.535                        8.269

 iii LDGT2 VMIX   3.61    2.98    3.18     3.85    3.88    3.88                  2.95    3.65    3.78    6.46    4.89    4.89
   SUMM ADVMT    9.564   3.421  23.838   21.004   5.901  11.193      74.921     3.705  11.604  18.619  22.882   3.599  10.460    70.868   145.789
   EM.FAC G/ML   40.96      22   26.44    27.97   30.52   38.35                 40.96   22.89   23.61   27.42   24.82   25.58
   EMISS TPSD    0.432   0.083   0.695    0.648   0.199   0.473       0.000     0.167   0.293   0.485   0.692   0.098   0.295                        4.558

 iv  HDGV VMIX    1.80    1.46    1.31     1.32    1.00    1.00                  2.51    1.96    1.24    2.01    2.50    2.50
   SUMM ADVMT    4.769   1.676   9.820    7.201   1.521   2.885      27.872     3.152   6.231   6.108   7.120   1.840   5.348    29.798    57.670
   EM.FAC G/ML      51   40.62    44.8    48.19   54.77   78.63                    51   40.62   40.64   46.93   41.92   43.15
   EMISS TPSD    0.268   0.075   0.485    0.383   0.092   0.250                 0.177   0.279   0.274   0.368   0.085   0.254                        2.990

 v   LDDV VMIX    1.10    1.18    1.18     1.16    1.17    1.17                  1.02    1.15    1.15    1.03    1.06    1.06
   SUMM ADVMT    2.914   1.355   8.846    6.328   1.779   3.375      24.597     1.281   3.656   5.664   3.648   0.780   2.267    17.297    41.895
   EM.FAC G/ML    0.84    0.76    0.89     0.96     1.1    1.57                  0.84    0.76    0.78    0.94    0.82    0.85
   EMISS TPSD    0.003   0.001   0.009    0.007   0.002   0.006                 0.001   0.003   0.005   0.004   0.001   0.002                        0.043

 vi  LDDT VMIX    0.09    0.07    0.08     0.09    0.10    0.10                  0.07    0.09    0.09    0.16    0.12    0.12
   SUMM ADVMT    0.238   0.080   0.600    0.491   0.152   0.288       1.850     0.088   0.286   0.443   0.567   0.088   0.257     1.729     3.579
   EM.FAC G/ML    0.96    0.87    1.01      1.1    1.26    1.79                  0.96    0.87    0.88    1.07    0.93    0.97
   EMISS TPSD    0.000   0.000   0.001    0.001   0.000   0.001                 0.000   0.000   0.000   0.001   0.000   0.000                        0.004

 vii HDDV VMIX    5.70    2.74    2.09     1.48    1.20    1.20                 13.09    2.74    2.06    2.69    2.50    2.50
   SUMMER VMT    15.10    3.15   15.67     8.07    1.83    3.46      47.274     16.44    8.71   10.15    9.53    1.84    5.35    52.013    99.288
   EM.FAC G/ML    6.72    6.09    7.13     7.73    8.84    12.6                  6.72    6.09    6.22    7.51    6.57    6.82
   EMISS TPSD    0.112   0.021   0.123    0.069   0.018   0.048                 0.122   0.058   0.070   0.079   0.013   0.040                        0.773

 iix MC VMIX      0.60    0.40    0.50     0.40    0.50    0.50                  0.60    0.20    0.60    0.50    2.40    2.40
   SUMM ADVMT     1.59    0.46    3.75     2.18    0.76    1.44      10.182      0.75    0.64    2.96    1.77    1.77    5.13    13.016    23.198
   EM.FAC G/ML   25.50   13.41   17.68    19.64   22.87   32.42                 25.50   13.41   14.19   18.94   15.65   16.59
   EMISS TPSD    0.045   0.007   0.073    0.047   0.019   0.052                 0.021   0.009   0.046   0.037   0.030   0.094                        0.481

                                                                                                          COUNTY TOTAL       3693.2368    97.843
                    MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO MIDDLESEX COUNTY

m5cowMDX6a
 10/20/93     INTER-   FREEWY  PRINCIP    MINOR                            VMT      INTER PRINCIPL   MINOR   MAJOR   MINOR                VMT       VMT     TOTAL
               STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL       TOTAL      STATE   ARTERY  ARTERY COLLECT COLLECT    LOCAL     TOTAL     TOTAL EMISSIONS
 COUNTIES     URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6       U1-U6    RURAL1   RURAL2  RURAL3  RURAL4  RURAL5   RURAL6     R1-R6 ALL ROADS   CO TPWD
 --------    -------  -------  -------  -------  -------  -------      ======    ------- ------- ------- ------- ------- -------    ======= ========= ========
 1  ADVMT       8186     3352     5663     3025     2158     3869       26253        527     166     486     244      67     183       1673     27926
WINTER *.9812 8032.103 3288.982 5556.536 2968.130 2117.43 3796.263 25759.444    517.092 162.879 476.863 239.413  65.740 179.560   1641.548 27400.991
      SPEED       60       54       44       44       25       28                   60      42      43      39      33      34


 i   LDGV VMIX      80    85.32    85.42    84.14    84.53    84.53                73.98   83.05   83.65   74.47   76.94   76.94
   SUMM ADVMT 6425.683 2806.160 4746.393 2497.385 1789.86 3208.981 21474.464    382.545 135.271 398.896 178.291  50.581 138.153   1283.737 22758.201
   EM.FAC G/ML   35.36    18.95    19.81    19.81    28.59    26.39                35.36   20.32   20.05   21.21   23.59   23.13
   EMISS TPSD  250.456   58.617  103.645   54.534   56.407   93.348               14.911   3.030   8.816   4.168   1.315   3.522                        652.770

 ii  LDGT1 VMIX    7.1     5.85     6.24     7.56     7.62     7.62                 5.78    7.16    7.43   12.68    9.59    9.59
   SUMM ADVMT  570.279  192.405  346.728  224.391  161.348  289.275    1784.427     29.888  11.662  35.431  30.358   6.305  17.220    130.863  1915.289
   EM.FAC G/ML    42.2    21.09    21.76    21.76    30.18    28.05                 42.2   22.19   21.97   22.99   25.27   24.82
   EMISS TPSD   26.528    4.473    8.317    5.382    5.368    8.944                1.390   0.285   0.858   0.769   0.176   0.471                         62.961

 iii LDGT2 VMIX   3.61     2.98     3.18     3.85     3.88     3.88                 2.95    3.65    3.78    6.46    4.89    4.89
   SUMM ADVMT  289.959   98.012  176.698  114.273   82.156  147.295     908.393     15.254   5.945  18.025  15.466   3.215   8.780     66.686   975.079
   EM.FAC G/ML   45.57    22.49    23.35    23.35    32.92    30.52                45.57   23.88   23.61   24.82   27.42   26.92
   EMISS TPSD   14.565    2.430    4.548    2.941    2.981    4.955       0.000      0.766   0.156   0.469   0.423   0.097   0.261                         34.593

 iv  HDGV VMIX    1.80     1.46     1.31     1.32     1.00     1.00                 2.51    1.96    1.24    2.01    2.50    2.50
   SUMM ADVMT  144.578   48.019   72.791   39.179   21.174   37.963     363.704     12.979   3.192   5.913   4.812   1.644   4.489     33.029   396.733
   EM.FAC G/ML   52.71    44.72    40.54    40.54     61.7    54.77                52.71   40.82   40.64   41.92   46.93    45.8
   EMISS TPSD    8.400    2.367    3.253    1.751    1.440    2.292                0.754   0.144   0.265   0.222   0.085   0.227                         21.200

 v   LDDV VMIX    1.10     1.18     1.18     1.16     1.17     1.17                 1.02    1.15    1.15    1.03    1.06    1.06
   SUMM ADVMT   88.353   38.810   65.567   34.430   24.774   44.416     296.351      5.274   1.873   5.484   2.466   0.697   1.903     17.698   314.048
   EM.FAC G/ML    0.85     0.78     0.77     0.77     1.24      1.1                 0.85    0.78    0.78    0.82    0.94    0.91
   EMISS TPSD    0.083    0.033    0.056    0.029    0.034    0.054                0.005   0.002   0.005   0.002   0.001   0.002                          0.305

 vi  LDDT VMIX    0.09     0.07     0.08     0.09     0.10     0.10                 0.07    0.09    0.09    0.16    0.12    0.12
   SUMM ADVMT    7.229    2.302    4.445    2.671    2.117    3.796      22.561      0.362   0.147   0.429   0.383   0.079   0.215      1.615    24.177
   EM.FAC G/ML    0.98     0.89     0.88     0.88     1.42     1.26                 0.98    0.89    0.88    0.93    1.07    1.04
   EMISS TPSD    0.008    0.002    0.004    0.003    0.003    0.005                0.000   0.000   0.000   0.000   0.000   0.000                          0.027

 vii HDDV VMIX    5.70     2.74     2.09     1.48     1.20     1.20                13.09    2.74    2.06    2.69    2.50    2.50
   SUMMER VMT   457.83    90.12   116.13    43.93    25.41    45.56     778.972      67.69    4.46    9.82    6.44    1.64    4.49     94.546   873.519
   EM.FAC G/ML    6.86     6.24     6.17     6.17     9.96     8.84                 6.86    6.29    6.22    6.57    7.51    7.31
   EMISS TPSD    3.462    0.620    0.790    0.299    0.279    0.444                0.512   0.031   0.067   0.047   0.014   0.036                          6.600

 iix MC VMIX      0.60     0.40     0.50     0.40     0.50     0.50                 0.60    0.20    0.60    0.50    2.40    2.40
   SUMM ADVMT    48.19    13.16    27.78    11.87    10.59    18.98     130.572       3.10    0.33    2.86    1.20    1.58    4.31     13.374   143.946
   EM.FAC G/ML   28.63    12.99    13.91    13.91    25.84    22.87                28.63   14.51   14.19   15.65   18.94   18.29
   EMISS TPSD    1.521    0.188    0.426    0.182    0.302    0.479                0.098   0.005   0.045   0.021   0.033   0.087                          3.386

                                                                                                                   COUNTY TOTAL     27400.991   781.842
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MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER SUMMER DAY -CO NANTUCKET COUNTY

m5cowNAN6a

10/20/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS CO TPWD
1 ADVMT	0	0	0	0	0	0	0	0	0	0	55	14	30	99	99	
WINTER *.9812	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	53.966	13.737	29.436	97.139	97.139	
SPEED	NA	NA	NA	NA	NA	NA		NA	NA	NA	35	40	23			
i LDGV VMIX	0	0	0	0	0	0	0	0	0	0	74.47	76.94	76.94			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.188	10.569	22.648	73.406	73.406	
EM.FAC G/ML	0	0	0	0	0	0	0	0	0	0	22.69	20.89	30.34			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	1.005	0.243	0.757			2.006
ii LDGT1 VMIX	0	0	0	0	0	0	0	0	0	0	12.68	9.59	9.59			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.843	1.317	2.823	10.983	10.983	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	24.4	22.7	31.85			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.184	0.033	0.099			0.316
iii LDGT2 VMIX	0	0	0	0	0	0	0	0	0	0	6.46	4.89	4.89			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.486	0.672	1.439	5.597	5.597	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	26.44	24.49	34.83			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.018	0.055			0.175
iv HDGV VMIX	0	0	0	0	0	0	0	0	0	0	2.01	2.50	2.50			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.085	0.343	0.736	2.164	2.164	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	44.8	41.46	67.54			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.054	0.016	0.055			0.124
v LDDV VMIX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03	1.06	1.06			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.556	0.146	0.312	1.013	1.013	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	0.89	0.8	1.36			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.001	0.000	0.000			0.001
vi LDDT VMIX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.12	0.12			
SUMM ADVMT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.086	0.016	0.035	0.138	0.138	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	1.01	0.92	1.55			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000			0.000
vii HDDV VMIX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.69	2.50	2.50			
SUMMER VMT	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	1.45	0.34	0.74	2.531	2.531	
EM.FAC G/ML	0	0	0	0	0	0		0	0	0	7.13	6.46	10.88			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.011	0.002	0.009			0.023
iix MC VMIX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	2.40	2.40			
SUMM ADVMT	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.27	0.33	0.71	1.306	1.306	
EM.FAC G/ML	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	17.68	15.23	28.17			
EMISS TPSD	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.005	0.006	0.022			0.033
													COUNTY TOTAL		97.1388	2.678

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                    MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO NORFOLK COUNTY

m5coWNOR6a
  10/20/93     INTER-   FREEWY  PRINCIP    MINOR                                VMT       INTER PRINCIPL   MINOR    MAJOR    MINOR                 VMT        VMT     TOTAL
                STATE  EXPRESS   ARTERY   ARTERY  COLLECT    LOCAL            TOTAL       STATE   ARTERY   ARTERY  COLLECT  COLLECT    LOCAL       TOTAL      TOTAL  EMISSIONS
  COUNTIES     URBAN1   URBAN2   URBAN3   URBAN4   URBAN5   URBAN6            U1-U6      RURAL1   RURAL2   RURAL3   RURAL4   RURAL5   RURAL6       R1-R6  ALL ROADS
  --------    -------  -------  -------  -------  -------  -------           ======     -------  -------  -------  -------  -------  -------     ======= ========= ========
 1  ADVMT        5016     1107     3652     1967      954     1959            14655         126        0      117       50        8       29         330      14985
WINTER *.9812 4921.699 1086.188 3583.342 1930.020  936.065 1922.171       14379.486     123.631    0.000  114.800   49.060    7.850   28.455     323.796  14703.282
      SPEED        60       51       39       36       32       29                           60       NA       52       39       39       31


i   LDGV VMIX      80    85.32    85.42    84.14    84.53    84.53                        73.98    83.05    83.65    74.47    76.94    76.94
   SUMM ADVMT 3937.359  926.736 3060.891 1623.919  791.256 1624.811       11964.972      91.462    0.000   96.031   36.535    6.039   21.893     251.960  12216.933
   EM.FAC G/ML  35.36    18.95    21.21    22.29    24.08    25.76                        35.36        0    18.95    21.21    21.21     24.6
   EMISS TPSD 153.468   19.358   71.563   39.900   21.003   46.137                        3.565    0.000    2.006    0.854    0.141    0.594                          358.589

ii  LDGT1 VMIX    7.1     5.85     6.24     7.56     7.62     7.62                         5.78     7.16     7.43    12.68     9.59     9.59
   SUMM ADVMT 349.441   63.542  223.601  145.910   71.328  146.469        1000.290       7.146    0.000    8.530    6.221    0.753    2.729      25.378   1025.668
   EM.FAC G/ML   42.2    21.09    22.99       24    25.76    27.42                           42        0    21.09    22.99    22.99    26.28
   EMISS TPSD  16.255    1.477    5.666    3.860    2.025    4.427                        0.331    0.000    0.198    0.158    0.019    0.079                           34.496

iii LDGT2 VMIX   3.61     2.98     3.18     3.85     3.88     3.88                         2.95     3.65     3.78     6.46     4.89     4.89
   SUMM ADVMT 177.673   32.368  113.950   74.306   36.319   74.580         509.197       3.647    0.000    4.339    3.169    0.384    1.391      12.931    522.129
   EM.FAC G/ML  45.57    22.49    24.82    25.99    27.97    29.82                        45.57        0    22.49    24.82    24.82    28.54
   EMISS TPSD   8.925    0.802    3.118    2.129    1.120    2.451           0.000       0.183    0.000    0.108    0.087    0.011    0.044                           18.977

iv  HDGV VMIX    1.80     1.46     1.31     1.32     1.00     1.00                         2.51     1.96     1.24     2.01     2.50     2.50
   SUMM ADVMT  88.591   15.858   46.942   25.476    9.361   19.222         205.449       3.103    0.000    1.424    0.986    0.196    0.711       6.420    211.870
   EM.FAC G/ML  52.71    42.43    41.92    43.92    48.19    52.87                        52.71        0    43.08    41.92    41.92    49.59
   EMISS TPSD   5.147    0.742    2.169    1.233    0.497    1.120                        0.180    0.000    0.068    0.046    0.009    0.039                           11.250

v   LDDV VMIX    1.10     1.18     1.18     1.16     1.17     1.17                         1.02     1.15     1.15     1.03     1.06     1.06
   SUMM ADVMT  54.139   12.817   42.283   22.388   10.952   22.489         165.069       1.261    0.000    1.320    0.505    0.083    0.302       3.471    168.540
   EM.FAC G/ML   0.85     0.76     0.82     0.87     0.96     1.06                         0.85        0     0.76     0.82     0.82     0.99
   EMISS TPSD   0.051    0.011    0.038    0.021    0.012    0.026                        0.001    0.000    0.001    0.000    0.000    0.000                            0.162

vi  LDDT VMIX    0.09     0.07     0.08     0.09     0.10     0.10                         0.07     0.09     0.09     0.16     0.12     0.12
   SUMM ADVMT   4.430    0.760    2.867    1.737    0.936    1.922          12.652       0.087    0.000    0.103    0.078    0.009    0.034       0.312     12.964
   EM.FAC G/ML   0.98     0.87     0.93     0.99      1.1     1.21                         0.98        0     0.87     0.93     0.93     1.13
   EMISS TPSD   0.005    0.001    0.003    0.002    0.001    0.003                        0.000    0.000    0.000    0.000    0.000    0.000                            0.014

vii HDDV VMIX    5.70     2.74     2.09     1.48     1.20     1.20                        13.09     2.74     2.06     2.69     2.50     2.50
   SUMMER VMT  280.54    29.76    74.89    28.56    11.23    23.07         448.053        16.18     0.00     2.36     1.32     0.20     0.71      20.776    468.829
   EM.FAC G/ML   6.86      6.1     6.57     6.97     7.73     8.53                         6.86        0     6.14     6.57     6.57     7.97
   EMISS TPSD   2.121    0.200    0.542    0.219    0.096    0.217                        0.122    0.000    0.016    0.010    0.001    0.006                            3.552

iix MC VMIX      0.60     0.40     0.50     0.40     0.50     0.50                         0.60     0.20     0.60     0.50     2.40     2.40
   SUMM ADVMT   29.53     4.34    17.92     7.72     4.68     9.61          73.803         0.74     0.00     0.69     0.25     0.19     0.68       2.547     76.350
   EM.FAC G/ML  28.63    12.99    15.65    17.12    19.64    21.99                        28.63     0.00    12.99    15.65    15.65    20.38
   EMISS TPSD   0.932    0.062    0.309    0.146    0.101    0.233                        0.023    0.000    0.010    0.004    0.003    0.015                            1.839

                                                                                                                      COUNTY TOTAL      14703.282  428.879
```

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO PLYMOUTH COUNTY

m5cowPLY6a 10/20/93 COUNTIES	INTER-STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1↑	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS CO TPWD
1 ADVMT	241	704	2222	1269	616	945	5997	811	628	309	410	148	329	2635	8632	
WINTER *.9812	236.469	690.765	2180.226	1245.143	604.419	927.234	5884.256	795.753	616.194	303.191	402.292	145.218	322.815	2585.462	8469.718	
SPEED	60	60	44	40	29	28		60	58	51	48	31	27			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		73.98	83.05	83.65	74.47	76.94	76.94			
SUMM ADVMT	189.175	589.361	1862.349	1047.663	510.916	783.791	4983.255	588.698	511.749	253.619	299.587	111.730	248.374	2013.757	6997.012	
EM.FAC G/ML	35.36	35.36	19.81	20.89	25.76	26.39		35.36	28.79	18.95	18.95	24.6	27.7			
EMISS TPSD	7.374	22.972	40.667	24.125	14.508	22.800		22.946	16.240	5.298	6.258	3.030	7.584			193.801
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		5.78	7.16	7.43	12.68	9.59	9.59			
SUMM ADVMT	16.789	40.410	136.046	94.133	46.057	70.655	404.090	45.995	44.119	22.527	51.011	13.926	30.958	208.536	612.626	
EM.FAC G/ML	42.2	42.2	21.76	22.7	27.42	28.05		42.2	33.76	21.08	21.09	26.28	28.72			
EMISS TPSD	0.781	1.880	3.263	2.355	1.392	2.185		2.140	1.642	0.523	1.186	0.403	0.980			18.730
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		2.95	3.65	3.78	6.46	4.89	4.89			
SUMM ADVMT	8.537	20.585	69.331	47.938	23.451	35.977	205.819	23.475	22.491	11.461	25.988	7.101	15.786	106.301	312.120	
EM.FAC G/ML	45.57	45.57	23.35	24.49	29.82	30.52		45.57	36.34	22.49	22.49	28.54	31.26			
EMISS TPSD	0.429	1.034	1.784	1.294	0.771	1.210	0.000	1.179	0.901	0.284	0.644	0.223	0.544			10.298
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		2.51	1.96	1.24	2.01	2.50	2.50			
SUMM ADVMT	4.256	10.085	28.561	16.436	6.044	9.272	74.655	19.973	12.077	3.760	8.086	3.630	8.070	55.597	130.252	
EM.FAC G/ML	52.71	52.71	40.54	41.46	52.87	54.77		52.71	49.46	42.43	41.07	49.59	56.86			
EMISS TPSD	0.247	0.586	1.276	0.751	0.352	0.560		1.160	0.658	0.176	0.366	0.198	0.506			6.838
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		1.02	1.15	1.15	1.03	1.06	1.06			
SUMM ADVMT	2.601	8.151	25.727	14.444	7.072	10.849	68.843	8.117	7.086	3.487	4.144	1.539	3.422	27.794	96.637	
EM.FAC G/ML	0.85	0.85	0.77	0,8	1.06	1.1		0.85	0.82	0.76	0.76	0.99	1.14			
EMISS TPSD	0.002	0.008	0.022	0.013	0.008	0.013		0.008	0.006	0.003	0.003	0.002	0.004			0.092
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0.07	0.09	0.09	0.16	0.12	0.12			
SUMM ADVMT	0.213	0.484	1.744	1.121	0.604	0.927	5.093	0.557	0.555	0.273	0.644	0.174	0.387	2.590	7.683	
EM.FAC G/ML	0.98	0.98	0.88	0.92	1.21	1.26		0.98	0.94	0.87	0.86	1.13	1.31			
EMISS TPSD	0.000	0.001	0.002	0.001	0.001	0.001		0.001	0.001	0.000	0.001	0.000	0.001			0.008
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		13.09	2.74	2.06	2.69	2.50	2.50			
SUMMER VMT	13.48	18.93	45.57	18.43	7.25	11.13	114.780	104.16	16.88	6.25	10.82	3.63	8.07	149.816	264.596	
EM.FAC G/ML	6.86	6.86	6.17	6.46	8.53	8.84		6.86	6.6	6.1	6.06	7.97	9.18			
EMISS TPSD	0.102	0.143	0.310	0.131	0.068	0.108		0.788	0.123	0.042	0.072	0.032	0.082			2.001
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0.60	0.20	0.60	0.50	2.40	2.40			
SUMM ADVMT	1.42	2.76	10.90	4.98	3.02	4.64	27.722	4.77	1.23	1.82	2.01	3.49	7.75	21.070	48.792	
EM.FAC G/ML	28.63	28.63	13.91	15.23	21.99	22.87		28.63	22.38	12.99	12.99	20.38	23.80			
EMISS TPSD	0.045	0.087	0.167	0.084	0.073	0.117		0.151	0.030	0.026	0.029	0.078	0.203			1.090
														COUNTY TOTAL	8469.7184	232.860

MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO SUFFOLK COUNTY

m5cowSUF6a
10/20/93

COUNTIES	INTER- STATE URBAN1	FREEWY EXPRESS URBAN2	PRINCIP ARTERY URBAN3	MINOR ARTERY URBAN4	COLLECT URBAN5	LOCAL URBAN6	VMT TOTAL U1-U6	INTER STATE RURAL1	PRINCIPL ARTERY RURAL2	MINOR ARTERY RURAL3	MAJOR COLLECT RURAL4	MINOR COLLECT RURAL5	LOCAL RURAL6	VMT TOTAL R1-R6	VMT TOTAL ALL ROADS	TOTAL EMISSIONS CO TPWD
1 ADVMT	1531	1414	1957	858	280	827	6867	NA	NA	NA	NA	NA	NA	0	6867	
WINTER *.9812	1502.217	1387.417	1920.208	841.870	274.736	811.452	6737.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6737.900	0.000
SPEED	57	43	34	30	31	29		NA	NA	NA	NA	NA	NA			
i LDGV VMIX	80	85.32	85.42	84.14	84.53	84.53		0	0	0	0	0	0			
SUMM ADVMT	1201.774	1183.744	1640.242	708.349	232.234	685.921	5652.264	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5652.264	
EM.FAC G/ML	25.51	20.05	23.13	25.16	24.6	25.76										
EMISS TPSD	33.793	26.162	41.820	19.645	6.297	19.477		0.000	0.000	0.000	0.000	0.000	0.000			147.195
ii LDGT1 VMIX	7.1	5.85	6.24	7.56	7.62	7.62		0	0	0	0	0	0			
SUMM ADVMT	106.657	81.164	119.821	63.645	20.935	61.833	454.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	454.055	
EM.FAC G/ML	29.53	21.97	24.82	26.83	26.28	27.42										
EMISS TPSD	3.472	1.966	3.278	1.882	0.606	1.869		0.000	0.000	0.000	0.000	0.000	0.000			13.073
iii LDGT2 VMIX	3.61	2.98	3.18	3.85	3.88	3.88		0	0	0	0	0	0			
SUMM ADVMT	54.230	41.345	61.063	32.412	10.660	31.484	231.194	0.000	0.000	0.000	0.000	0.000	0.000	0.000	231.194	
EM.FAC G/ML	31.72	23.61	26.92	29.16	28.54	29.82										
EMISS TPSD	1.896	1.076	1.812	1.042	0.335	1.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000			7.196
iv HDGV VMIX	1.80	1.46	1.31	1.32	1.00	1.00		0	0	0	0	0	0			
SUMM ADVMT	27.040	20.256	25.155	11.113	2.747	8.115	94.425	0.000	0.000	0.000	0.000	0.000	0.000	0.000	94.425	
EM.FAC G/ML	48.07	40.64	45.8	51.15	49.59	52.47										
EMISS TPSD	1.433	0.907	1.270	0.627	0.150	0.469		0.000	0.000	0.000	0.000	0.000	0.000			4.856
v LDDV VMIX	1.10	1.18	1.18	1.16	1.17	1.17		0	0	0	0	0	0			
SUMM ADVMT	16.524	16.372	22.658	9.766	3.214	9.494	78.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	78.028	
EM.FAC G/ML	0.81	0.78	0.91	1.03	0.99	1.06										
EMISS TPSD	0.015	0.014	0.023	0.011	0.004	0.011		0.000	0.000	0.000	0.000	0.000	0.000			0.077
vi LDDT VMIX	0.09	0.07	0.08	0.09	0.10	0.10		0	0	0	0	0	0			
SUMM ADVMT	1.352	0.971	1.536	0.758	0.275	0.811	5.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.703	
EM.FAC G/ML	0.92	0.88	1.04	1.17	1.13	1.21										
EMISS TPSD	0.001	0.001	0.002	0.001	0.000	0.001		0.000	0.000	0.000	0.000	0.000	0.000			0.006
vii HDDV VMIX	5.70	2.74	2.09	1.48	1.20	1.20		0	0	0	0	0	0			
SUMMER VMT	85.63	38.02	40.13	12.46	3.30	9.74	189.268	0.00	0.00	0.00	0.00	0.00	0.00	0.000	189.268	
EM.FAC G/ML	6.49	6.22	7.31	8.24	7.97	8.53										
EMISS TPSD	0.613	0.261	0.323	0.113	0.029	0.092		0.000	0.000	0.000	0.000	0.000	0.000			1.430
iix MC VMIX	0.60	0.40	0.50	0.40	0.50	0.50		0	0	0	0	0	0			
SUMM ADVMT	9.01	5.55	9.60	3.37	1.37	4.06	32.962	0.00	0.00	0.00	0.00	0.00	0.00	0.000	32.962	
EM.FAC G/ML	19.25	14.19	18.29	21.16	20.38	21.99										
EMISS TPSD	0.191	0.087	0.194	0.079	0.031	0.098		0.000	0.000	0.000	0.000	0.000	0.000			0.679
												COUNTY TOTAL			6737.9004	174.514

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            MOBILE5a EMISSIONS 1990 BY VEHICLE AND ROAD TYPE BY COUNTY - TONS PER WINTER DAY -CO WORCESTER COUNTY

m5cowWOR6a
  10/20/93    INTER-  FREEWY  PRINCIP    MINOR                          VMT     INTER PRINCIPL   MINOR   MAJOR   MINOR                VMT       VMT    TOTAL
               STATE EXPRESS   ARTERY   ARTERY COLLECT    LOCAL       TOTAL     STATE   ARTERY  ARTERY COLLECT COLLECT   LOCAL     TOTAL     TOTAL EMISSIONS
   COUNTIES   URBAN1  URBAN2   URBAN3   URBAN4  URBAN5   URBAN6       U1-U6    RURAL1   RURAL2  RURAL3  RURAL4  RURAL5  RURAL6     R1-R6 ALL ROADS   CO TPWD
  ---------  ------- ------- -------  ------- ------- -------        ======   ------- ------- ------- ------- ------- -------   ======= ========= ========
 1 BARN ADVMT   3886    1314    3473     1460     738     1208        12079      1465     453    1520     981     205     562      5186     17265
WINTER *.9812 3812.943 1289.297 3407.708 1432.552 724.126 1185.290 11851.915  1437.46 444.484 1491.42 962.557 201.146 551.434  5088.503 16940.418
       SPEED      54      57      45       39      40       28                   59      43      53      40      35      25


i   LDGV VMIX     80   85.32   85.42    84.14   84.53    84.53                73.98   83.05   83.65   74.47   76.94   76.94
   SUMM ADVMT 3050.355 1100.028 2910.864 1205.349 612.103 1001.925  9880.624  1063.43  369.14 1247.58 716.816 154.762 424.274  3976.003 13856.627
   EM.FAC G/ML  18.95   25.51   19.57    21.21   20.89    26.39                32.07   20.05   18.95   20.89   22.69   28.59
   EMISS TPSD  63.718  30.932  62.793   28.181  14.095   29.146                37.593   8.158  26.060  16.506   3.871  13.371                          334.424

ii  LDGT1 VMIX    7.1    5.85    6.24     7.56    7.62     7.62                 5.78    7.16    7.43   12.68    9.59    9.59
   SUMM ADVMT 270.719  75.424 212.641  108.301  55.178   90.319    812.582    83.085  31.825 110.813 122.052  19.290  52.883   419.948  1232.530
   EM.FAC G/ML  21.09   29.53   21.58    22.99    22.7    28.05                37.98   21.97   21.09    22.7    24.4   30.18
   EMISS TPSD   6.294   2.455   5.058    2.745   1.381    2.793                 3.478   0.771   2.576   3.054   0.519   1.759                           32.882

iii LDGT2 VMIX   3.61    2.98    3.18     3.85    3.88     3.88                 2.95    3.65    3.78    6.46    4.89    4.89
   SUMM ADVMT 137.647  38.421 108.365   55.153  28.096   45.989    413.672    42.405  16.224  56.376  62.181   9.836  26.965   213.987   627.659
   EM.FAC G/ML  22.49   31.72   23.12    24.82   24.49    30.53                40.96   23.61   22.49   24.49   26.44   32.92
   EMISS TPSD   3.412   1.343   2.762    1.509   0.758    1.548      0.000     1.915   0.422   1.398   1.679   0.287   0.979                           18.011

iv  HDGV VMIX    1.80    1.46    1.31     1.32    1.00     1.00                 2.51    1.96    1.24    2.01    2.50    2.50
   SUMM ADVMT  68.633  18.824  44.641   18.910   7.241   11.853    170.102    36.080   8.712  18.494  19.347   5.029  13.786   101.448   271.549
   EM.FAC G/ML  44.72   48.07   40.54    41.92   41.46    54.77                   51   40.64   43.85   41.46    44.8    61.7
   EMISS TPSD   3.383   0.997   1.995    0.874   0.331    0.716                 2.028   0.390   0.894   0.884   0.248   0.938                           13.679

v   LDDV VMIX    1.10    1.18    1.18     1.16    1.17     1.17                 1.02    1.15    1.15    1.03    1.06    1.06
   SUMM ADVMT  41.942  15.214  40.211   16.618   8.472   13.868    136.325    14.662   5.112  17.151   9.914   2.132   5.845    54.817   191.141
   EM.FAC G/ML   0.78    0.81    0.76     0.82     0.8      1.1                 0.84    0.78    0.77     0.8    0.89    1.24
   EMISS TPSD   0.036   0.014   0.034    0.015   0.007    0.017                 0.014   0.004   0.015   0.009   0.002   0.008                            0.174

vi  LDDT VMIX    0.09    0.07    0.08     0.09    0.10     0.10                 0.07    0.09    0.09    0.16    0.12    0.12
   SUMM ADVMT   3.432   0.903   2.726    1.289   0.724    1.185     10.259     1.006   0.400   1.342   1.540   0.241   0.662     5.192    15.451
   EM.FAC G/ML   0.89    0.92    0.87     0.93    0.92     1.26                 0.96    0.88    0.88    0.92    1.01    1.42
   EMISS TPSD   0.003   0.001   0.003    0.001   0.001    0.002                 0.001   0.000   0.001   0.002   0.000   0.001                            0.016

vii HDDV VMIX    5.70    2.74    2.09     1.48    1.20     1.20                13.09    2.74    2.06    2.69    2.50    2.50
   SUMMER VMT  217.34   35.33   71.22    21.20    8.69    14.22    368.000    188.16   12.18   30.72   25.89    5.03   13.79   275.773   643.773
   EM.FAC G/ML   6.24    6.49    6.13     6.57    6.46     8.84                 6.72    6.22    6.18    6.46    7.13    9.96
   EMISS TPSD   1.495   0.253   0.481    0.154   0.062    0.139                 1.394   0.084   0.209   0.184   0.040   0.151                            4.645

iix MC VMIX      0.60    0.40    0.50     0.40    0.50     0.50                 0.60    0.20    0.60    0.50    2.40    2.40
   SUMM ADVMT   22.88    5.16   17.04     5.73    3.62     5.93     60.351      8.62    0.89    8.95    4.81    4.83   13.23    41.337   101.688
   EM.FAC G/ML  12.99   19.25   13.65    15.65   15.23    22.87                25.50   14.19   12.99   15.23   17.68   25.84
   EMISS TPSD   0.328   0.109   0.256    0.099   0.061    0.149                 0.242   0.014   0.128   0.081   0.094   0.377                            1.939

                                                                                                      COUNTY TOTAL        16940.418  405.769
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APPENDIX C.2

MOBILE5a INPUT/OUTPUT FILES FOR

VOC - SUMMER

NOx - SUMMER

CO - SUMMER

MEMORANDUM

TO: Leah Weiss

FROM: Jeff Gifford J.G.

RE: Updated table for RVP Audit Result Summary (1989 -1992)

DATE: November 3, 1992

Below is an updated table showing RVP Audit Averages for Industry, DEP Grabner, and EPA Grabner Results (1989-1992), as requested.

TABLE 3.

RVP Audit Averages for Industry, DEP Grabner, and EPA Grabner Results (1989 - 1992)

Source of RVP Audit Results	1989	1990	1991	1992
Industry	8.4 (403)	8.5 (1,095)	8.4 (815)	8.3 (938)
DEP Grabner	-	8.6 (18)	8.0 (60)	-
EPA Grabner	8.4 (37)	-	-	-

Numbers within parentheses represent number of samples.
Dashes, "-", indicate that RVP data is not available for the given years.

```
   U1 INTERSTATE MOBILE5a INPUT 10/4/93
1           PROMPT - vertical flag input, no prompting
            MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1           TAMFLG - default tampering rates

1           SPDFLG - one speed per scenario
3           VMFLAG -             vehicle mix-state

3          MYMRFG - local registration and default mileage accrual
rates
1           NEWFLG - default exhaust emission rates

2           IMFLAG - include I/M program

1           ALHFLG - no additional correction factor inputs

1           ATPFLG - no anti-tampering program

1            RLFLAG - Stage II vapor recovery program not in Base
Year
2          LOCFLG - read in local area parameters one time for all
scenarios
1           TEMFLG - use max/min temps
4           OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2           IDLFLG - print idle emissions results

3               NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4           HCFLAG - tot & comps HC

.800.071.036.018.011.001.057.006
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1       .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
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    U1 INTERSTATE MOBILE5a OUTPUT 10/4/93
1            MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                1983
     Pre-1981 MYR stringency rate:           12%
     First model year covered:              1976
     Last model year covered:               2020
     Waiver rate (pre-1981):                  1.%
     Waiver rate (1981 and newer):            1.%
     Compliance Rate:                       80.%
     Inspection type:                          Computerized Test and
Repair
     Inspection frequency                   Annual
     Vehicle types covered:                 LDGV - Yes
                                           LDGT1 - Yes
                                           LDGT2 - Yes
                                            HDGV - No
     1981 & later MYR test type:            Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 68. (F)  Maximum Temp: 94. (F)
                     Period 1 RVP: 11.5       Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______

______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix: 0.800  0.071  0.036        0.018  0.011  0.001  0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.79  42.13   1.46   2.05   6.19
26.55  21.79
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46   2.05   6.19
18.37  10.16
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Exhst  CO: 11.69  13.97  15.07  14.34  43.97   0.78   0.89   6.11
10.97  12.10
 Exhst NOX:  2.07   2.47   2.64   2.53   7.20   1.80   2.07  21.65
 1.23   3.32

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                           I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+
                ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 54.0   54.0   54.0          54.0   54.0   54.0   54.0
 54.0
   VMT Mix:  0.800  0.071  0.036         0.018  0.011  0.001  0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  1.75   2.00   2.22   2.07   4.27   0.31   0.43   1.31
10.12    1.84
 Exhst   HC:  0.79   0.99   1.11   1.03   1.15   0.31   0.43   1.31
1.94   0.85
 Evap.   HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.18
 Runing HC:  0.14   0.13   0.17   0.15   0.33
        0.13
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst   CO: 11.69  13.97  15.07  14.34  44.85   0.79   0.90   6.17
10.97  12.12
 Exhst NOX:  2.15   2.55   2.73   2.61   7.25   1.85   2.13  22.27
 1.26   3.43

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                           I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
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 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.18
 Runing HC:  0.13    0.12    0.16    0.14    0.31
        0.12
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 13.79   16.82   18.22   17.29   46.96    0.81    0.92    6.32
13.61  14.18
 Exhst NOX:  2.30    2.72    2.92    2.79    7.35    1.96    2.26   23.65
 1.33   3.65

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+
           ______ ______ ______ ______ ______ ______ ______ ______
_____  _____
 Veh. Spd.: 57.0    57.0   57.0          57.0   57.0   57.0   57.0
 57.0
   VMT Mix:  0.800  0.071  0.036          0.018  0.011  0.001  0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.84    2.12    2.36    2.20    4.22    0.30    0.43    1.29
10.40   1.93
 Exhst  HC:  0.89    1.12    1.26    1.17    1.13    0.30    0.43    1.29
2.22    0.95
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.18
 Runing HC:  0.13    0.12    0.16    0.13    0.30
        0.12
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 15.88   19.67   21.37   20.24   48.21    0.82    0.93    6.42
16.25  16.21
 Exhst NOX:  2.37    2.81    3.01    2.88    7.39    2.02    2.34   24.42
 1.37   3.76

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
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0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 58.0   58.0   58.0          58.0    58.0    58.0    58.0
 58.0
   VMT Mix:  0.800  0.071  0.036         0.018   0.011   0.001   0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.89   2.18   2.43   2.27   4.21    0.30    0.42    1.28
10.54   1.97
 Exhst  HC:  0.94   1.19   1.34   1.24   1.13    0.30    0.42    1.28
 2.36   1.00
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.18
 Runing HC:  0.12   0.12   0.15   0.13   0.29
        0.12
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 17.98  22.52  24.51  23.19  49.61    0.83    0.95    6.52
18.89  18.25
 Exhst NOX:  2.44   2.89   3.11   2.97   7.44    2.09    2.42   25.26
 1.40   3.88

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 59.0   59.0   59.0          59.0    59.0    59.0    59.0
 59.0
   VMT Mix:  0.800  0.071  0.036         0.018   0.011   0.001   0.057
0.006
0Composite Emission Factors (Gm/Mile)
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```
 VOC    HC:  1.94    2.25    2.50    2.33    4.20    0.30    0.42    1.28
10.68   2.02
 Exhst  HC:  0.99    1.26    1.42    1.31    1.13    0.30    0.42    1.28
 2.50   1.05
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.18
 Runing HC:  0.12    0.11    0.15    0.12    0.28
         0.11
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 20.07   25.37   27.66   26.14   51.15    0.85    0.96    6.65
21.53   20.29
 Exhst NOX:  2.52    2.98    3.20    3.05    7.49    2.17    2.50   26.16
 1.44   4.00

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 60.0   60.0   60.0          60.0   60.0   60.0   60.0
 60.0
   VMT Mix:  0.800  0.071  0.036         0.018  0.011  0.001  0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.98    2.31    2.57    2.40    4.19    0.30    0.42    1.27
10.82   2.06
 Exhst  HC:  1.05    1.33    1.50    1.38    1.13    0.30    0.42    1.27
 2.64   1.10
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.18
 Runing HC:  0.11    0.11    0.14    0.12    0.27
         0.11
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 22.17   28.23   30.80   29.09   52.86    0.86    0.98    6.78
24.17   22.34
 Exhst NOX:  2.59    3.07    3.29    3.14    7.54    2.25    2.60   27.13
 1.47   4.13
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    U2 FREEWAY & EXPRESSWAY MOBILE5a INPUTS 1990  10/4/93
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1          TAMFLG - default tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG -            vehicle mix-state

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                      PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.852.059.030.015.012.001.027.004
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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SIP C-2-2-1

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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1       .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
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000000000000000000000000000000000000
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HPr 6-2-2-3

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    U2 FREEWAY & EXPRESSWAY MOBILE5a OUTPUT 1990 10/4/93
1           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0     Start year (January 1):                1983
      Pre-1981 MYR stringency rate:           12%
      First model year covered:              1976
      Last model year covered:               2020
      Waiver rate (pre-1981):                 1.%
      Waiver rate (1981 and newer):           1.%
      Compliance Rate:                       80.%
      Inspection type:                          Computerized Test and
Repair
      Inspection frequency                   Annual
      Vehicle types covered:                 LDGV - Yes
                                            LDGT1 - Yes
                                            LDGT2 - Yes
                                             HDGV - No
      1981 & later MYR test type:            Idle
      Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                         Minimum Temp: 68. (F)   Maximum Temp: 94. (F)
                         Period 1 RVP: 11.5        Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.80  42.13   1.46   2.05   6.19
26.55  22.19
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46   2.05   6.19
18.37  10.22
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
```

```
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.94    2.14    2.40    2.23    4.72    0.36    0.51    1.53
10.22   2.01
 Exhst  HC:  0.87    1.06    1.20    1.11    1.41    0.36    0.51    1.53
2.04    0.91
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62    0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.24    0.20    0.26    0.22    0.51
         0.24
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56    0.09
 Exhst  CO: 12.58   14.68   16.02   15.13   40.94    0.79    0.90    6.22
12.23   12.90
 Exhst NOX:  1.67    2.01    2.13    2.05    6.66    1.45    1.67   17.48
 1.02   2.20

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+            ______  ______  ______  ______  ______  ______  ______  ______
______  ______
 Veh. Spd.: 43.0    43.0    43.0            43.0    43.0    43.0    43.0
 43.0
   VMT Mix:  0.852  0.059  0.030           0.015   0.012   0.001   0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.91    2.12    2.37    2.21    4.66    0.35    0.50    1.50
10.20   1.98
 Exhst  HC:  0.85    1.05    1.18    1.09    1.38    0.35    0.50    1.50
2.02    0.90
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62    0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.23    0.20    0.25    0.22    0.49
         0.22
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56    0.09
 Exhst  CO: 12.41   14.53   15.84   14.97   40.76    0.78    0.89    6.15
11.96   12.74
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 Exhst NOX:  1.68   2.01   2.14   2.06   6.71   1.47   1.69  17.70
 1.02   2.22

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          _____  _____  _____  _____  _____  _____  _____  _____
_____ _____
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC   HC:  1.88   2.10   2.35   2.18   4.61   0.35   0.49   1.48
10.18   1.95
 Exhst  HC:  0.84   1.04   1.16   1.08   1.34   0.35   0.49   1.48
 2.00   0.88
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.22   0.19   0.25   0.21   0.48
        0.21
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 12.25  14.40  15.66  14.82  40.66   0.78   0.89   6.10
11.73  12.58
 Exhst NOX:  1.68   2.02   2.14   2.06   6.76   1.49   1.72  17.95
 1.03   2.23

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

```
 MC   All Veh
+         ______  ______  ______  ______  ______  ______  ______  ______

______ ______
 Veh. Spd.: 45.0   45.0   45.0          45.0   45.0   45.0   45.0
 45.0
  VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.86   2.08   2.32   2.16   4.57   0.34   0.48   1.45
10.16   1.93
 Exhst  HC:  0.83   1.02   1.15   1.06   1.31   0.34   0.48   1.45
 1.98   0.87
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.21   0.19   0.24   0.20   0.46
        0.20
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 12.10  14.28  15.50  14.69  40.66   0.77   0.88   6.06
11.51  12.44
 Exhst NOX:  1.69   2.03   2.15   2.07   6.81   1.51   1.74  18.22
 1.04   2.24

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude: 500.
Ft.
                       I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+         ______  ______  ______  ______  ______  ______  ______  ______

______ ______
 Veh. Spd.: 46.0   46.0   46.0          46.0   46.0   46.0   46.0
 46.0
  VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.83   2.06   2.30   2.14   4.52   0.34   0.47   1.43
10.14   1.91
 Exhst  HC:  0.81   1.01   1.13   1.05   1.28   0.34   0.47   1.43
 1.96   0.86
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
```

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                     I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 48.0   48.0   48.0          48.0   48.0   48.0   48.0
 48.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.79   2.03   2.26   2.11   4.45   0.33   0.46   1.39
10.12   1.86
 Exhst  HC:  0.79   0.99   1.11   1.03   1.24   0.33   0.46   1.39
 1.94   0.83
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.17   0.17   0.22   0.18   0.42
        0.17
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.34  41.19   0.76   0.87   5.99
10.97  12.07
 Exhst NOX:  1.70   2.04   2.17   2.09   6.95   1.59   1.84  19.23
 1.06   2.29

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                     I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 49.0   49.0   49.0          49.0   49.0   49.0   49.0
 49.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.78   2.02   2.25   2.10   4.41   0.32   0.46   1.38
10.12   1.85
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 Exhst  HC:  0.79    0.99    1.11    1.03    1.22    0.32    0.46    1.38
 1.94   0.83
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.17    0.16    0.21    0.18    0.40
        0.16
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 11.69   13.97   15.07   14.34   41.55    0.76    0.87    6.00
10.97  12.08
 Exhst NOX:  1.78    2.13    2.26    2.17    7.00    1.63    1.88   19.64
 1.09   2.37

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes          Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No         Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 50.0   50.0   50.0           50.0   50.0   50.0   50.0
 50.0
   VMT Mix:  0.852  0.059  0.030          0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.78    2.02    2.24    2.09    4.38    0.32    0.45    1.36
10.12   1.85
 Exhst  HC:  0.79    0.99    1.11    1.03    1.20    0.32    0.45    1.36
 1.94   0.83
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.16    0.15    0.20    0.17    0.38
        0.16
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 11.69   13.97   15.07   14.34   42.00    0.77    0.87    6.01
10.97  12.08
 Exhst NOX:  1.85    2.21    2.36    2.26    7.05    1.66    1.92   20.08
 1.13   2.45

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low             Altitude:  500.
Ft.
                          I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 51.0   51.0   51.0          51.0   51.0   51.0   51.0
 51.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.77   2.01   2.24   2.09   4.35   0.32   0.45   1.35
10.12   1.84
 Exhst  HC:  0.79   0.99   1.11   1.03   1.18   0.32   0.45   1.35
 1.94   0.83
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.16   0.15   0.19   0.16   0.37
        0.15
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.34  42.55   0.77   0.88   6.03
10.97  12.09
 Exhst NOX:  1.93   2.30   2.45   2.35   7.10   1.70   1.97  20.56
 1.16   2.54

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low             Altitude:  500.
Ft.
                          I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 52.0   52.0   52.0          52.0   52.0   52.0   52.0
 Exhst  CO: 11.69  13.97  15.07  14.34  43.97   0.78   0.89   6.11
10.97  12.12
 Exhst NOX:  2.07   2.47   2.64   2.53   7.20   1.80   2.07  21.65
 1.23   2.71

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 54.0   54.0   54.0          54.0   54.0   54.0   54.0
 54.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.75   2.00   2.22   2.07   4.27   0.31   0.43   1.31
10.12   1.82
 Exhst  HC:  0.79   0.99   1.11   1.03   1.15   0.31   0.43   1.31
 1.94   0.83
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.14   0.13   0.17   0.15   0.33
        0.14
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.34  44.85   0.79   0.90   6.17
10.97  12.13
 Exhst NOX:  2.15   2.55   2.73   2.61   7.25   1.85   2.13  22.27
 1.26   2.80

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
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 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.13    0.12    0.16    0.14    0.31
        0.13
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56  0.09
 Exhst  CO: 13.79   16.82   18.22   17.29   46.96    0.81    0.92    6.32
13.61  14.23
 Exhst NOX:  2.30    2.72    2.92    2.79    7.35    1.96    2.26   23.65
 1.33   2.98

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+          ______  ______  ______  ______  ______  ______  ______  ______
_____  _____
 Veh. Spd.: 57.0    57.0    57.0            57.0    57.0    57.0    57.0
 57.0
   VMT Mix:  0.852  0.059  0.030           0.015   0.012   0.001   0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.84    2.12    2.36    2.20    4.22    0.30    0.43    1.29
10.40   1.91
 Exhst  HC:  0.89    1.12    1.26    1.17    1.13    0.30    0.43    1.29
 2.22   0.93
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62  0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.13    0.12    0.16    0.13    0.30
        0.12
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56  0.09
 Exhst  CO: 15.88   19.67   21.37   20.24   48.21    0.82    0.93    6.42
16.25  16.31
 Exhst NOX:  2.37    2.81    3.01    2.88    7.39    2.02    2.34   24.42
 1.37   3.08

________________________________________________________________________

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
```

APP C-2-2-12

2

```
 VOC    HC:  1.94    2.25    2.50    2.33    4.20    0.30    0.42    1.28
10.68   2.00
 Exhst  HC:  0.99    1.26    1.42    1.31    1.13    0.30    0.42    1.28
2.50    1.03
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.12    0.11    0.15    0.12    0.28
        0.12
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 20.07   25.37   27.66   26.14   51.15    0.85    0.96    6.65
21.53  20.47
 Exhst NOX:  2.52    2.98    3.20    3.05    7.49    2.17    2.50   26.16
 1.44   3.27

_________________________________________________________________________

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           _____  _____  _____  _____  _____  _____  _____  _____
_____ _____
 Veh. Spd.: 60.0   60.0   60.0          60.0   60.0   60.0   60.0
 60.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.98    2.31    2.57    2.40    4.19    0.30    0.42    1.27
10.82   2.05
 Exhst  HC:  1.05    1.33    1.50    1.38    1.13    0.30    0.42    1.27
2.64    1.08
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.11    0.11    0.14    0.12    0.27
        0.11
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 22.17   28.23   30.80   29.09   52.86    0.86    0.98    6.78
24.17  22.56
 Exhst NOX:  2.59    3.07    3.29    3.14    7.54    2.25    2.60   27.13
 1.47   3.37
```

#77 C-2-2-13

```
   U3 PRINCIPAL ARTERY MOBILE5a INPUTS 1990 10/4/93
1            PROMPT - vertical flag input, no prompting
             MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1            TAMFLG - default tampering rates

1            SPDFLG - one speed per scenario
3            VMFLAG -              vehicle mix-state

3           MYMRFG - local registration and default mileage accrual
rates
1            NEWFLG - default exhaust emission rates

2            IMFLAG - include I/M program

1            ALHFLG - no additional correction factor inputs

1            ATPFLG - no anti-tampering program

1             RLFLAG - Stage II vapor recovery program not in Base
Year
2           LOCFLG - read in local area parameters one time for all
scenarios
1            TEMFLG - use max/min temps
4            OUTFMT - 80 column descriptive format

4                  PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2            IDLFLG - print idle emissions results

3              NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4            HCFLAG - tot & comps HC

.854.062.032.013.012.001.021.005
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
```

```
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1       .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
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HP C 2-3-2

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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000
```

```
   U3 PRINCIPAL ARTERY MOBILE5a OUTPUT 1990   10/4/93
1           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                1983
     Pre-1981 MYR stringency rate:           12%
     First model year covered:              1976
     Last model year covered:               2020
     Waiver rate (pre-1981):                 1.%
     Waiver rate (1981 and newer):           1.%
     Compliance Rate:                       80.%
     Inspection type:                          Computerized Test and
Repair
     Inspection frequency                   Annual
     Vehicle types covered:                 LDGV - Yes
                                           LDGT1 - Yes
                                           LDGT2 - Yes
                                            HDGV - No
     1981 & later MYR test type:            Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 68. (F)   Maximum Temp: 94. (F)
                     Period 1 RVP: 11.5        Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix: 0.854  0.062  0.032         0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.81  42.13   1.46   2.05   6.19
26.55  22.26
 Exhst  HC: 10.23  10.61  12.91  11.40  15.14   1.46   2.05   6.19
18.37  10.25
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
```

APP C.2-3-4

```
________________________________________________________________________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.854  0.062  0.032         0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.20   2.37   2.66   2.47   5.31   0.43   0.60   1.81
10.54   2.28
 Exhst  HC:  1.02   1.23   1.39   1.28   1.85   0.43   0.60   1.81
 2.36   1.07
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.35   0.27   0.34   0.29   0.66
        0.33
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 14.43  16.50  18.17  17.07  45.94   0.92   1.05   7.23
15.42  14.76
 Exhst NOX:  1.64   1.95   2.07   1.99   6.27   1.38   1.59  16.67
 0.96   2.04

________________________________________________________________________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
```

```
 Veh. Spd.: 35.0   35.0   35.0          35.0   35.0   35.0   35.0
 35.0
   VMT Mix:  0.854  0.062  0.032        0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.16   2.34   2.62   2.43   5.22   0.42   0.59   1.77
10.49   2.24
 Exhst  HC:  1.00   1.20   1.36   1.26   1.78   0.42   0.59   1.77
2.31    1.05
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.34   0.26   0.33   0.28   0.64
         0.32
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 14.14  16.20  17.83  16.76  44.93   0.90   1.02   7.05
14.90   14.47
 Exhst NOX:  1.64   1.96   2.08   2.00   6.31   1.38   1.60  16.69
 0.97   2.05

____________________________________________________________________
________________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low             Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:  87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+                ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 36.0   36.0   36.0          36.0   36.0   36.0   36.0
 36.0
   VMT Mix:  0.854  0.062  0.032        0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.12   2.30   2.58   2.40   5.13   0.41   0.57   1.73
10.44   2.20
 Exhst  HC:  0.98   1.18   1.33   1.23   1.71   0.41   0.57   1.73
 2.26   1.03
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.32   0.25   0.32   0.27   0.62
         0.31
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 13.87   15.93   17.51   16.47   44.05    0.88    1.00    6.89
14.42  14.19
 Exhst NOX:  1.65    1.97    2.09    2.01    6.36    1.39    1.60   16.73
 0.98   2.05

_______________________________________________________________________________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+          ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 37.0    37.0   37.0            37.0    37.0    37.0    37.0
 37.0
   VMT Mix:  0.854  0.062  0.032           0.013   0.012   0.001   0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09    2.27    2.55    2.37    5.05    0.40    0.56    1.69
10.39   2.16
 Exhst  HC:  0.96    1.16    1.31    1.21    1.65    0.40    0.56    1.69
 2.22   1.00
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.31    0.24    0.31    0.26    0.60
         0.30
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 13.62   15.67   17.22   16.20   43.28    0.86    0.98    6.74
13.97  13.94
 Exhst NOX:  1.65    1.98    2.10    2.02    6.41    1.39    1.61   16.79
 0.99   2.06

_______________________________________________________________________________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
```

App C-2-3-?

```
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV    LDDT    HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______

______ ______
 Veh. Spd.: 38.0   38.0   38.0           38.0   38.0   38.0   38.0
 38.0
   VMT Mix:  0.854  0.062  0.032          0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  2.06   2.24   2.51   2.33   4.97   0.39   0.55   1.65
10.35    2.13
 Exhst   HC:  0.94   1.13   1.28   1.18   1.60   0.39   0.55   1.65
2.17     0.98
 Evap.   HC:  0.55   0.56   0.62   0.58   2.30
 7.62    0.59
 Refuel HC:   0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:   0.29   0.23   0.30   0.25   0.58
         0.28
 Rsting HC:   0.09   0.08   0.07   0.08   0.09
 0.56    0.09
 Exhst  CO: 13.38  15.43  16.94  15.95  42.61   0.84   0.96   6.61
13.56   13.70
 Exhst NOX:  1.66   1.98   2.10   2.02   6.46   1.40   1.62  16.88
 0.99    2.07

_________________________________________________________________

______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low             Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV    LDDT    HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______

______ ______
 Veh. Spd.: 39.0   39.0   39.0           39.0   39.0   39.0   39.0
 39.0
   VMT Mix:  0.854  0.062  0.032          0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
_VOC     HC:  2.02   2.22   2.48   2.31   4.90   0.38   0.54   1.62
10.31    2.10
 Exhst   HC:  0.92   1.11   1.26   1.16   1.54   0.38   0.54   1.62
 2.14    0.96
```

APP C.2-3-8

```
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.28    0.23    0.29    0.25    0.56
         0.27
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 13.16   15.22   16.69   15.72   42.05    0.83    0.94    6.49
13.18  13.48
 Exhst NOX:  1.66    1.99    2.11    2.03    6.51    1.41    1.63   16.99
1.00   2.07

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0    40.0    40.0            40.0    40.0    40.0    40.0
 40.0
   VMT Mix:  0.854   0.062   0.032           0.013   0.012   0.001   0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.99    2.19    2.45    2.28    4.83    0.37    0.53    1.59
10.28   2.07
 Exhst  HC:  0.90    1.10    1.24    1.14    1.50    0.37    0.53    1.59
 2.10   0.94
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.27    0.22    0.28    0.24    0.54
         0.26
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 12.95   15.02   16.45   15.51   41.58    0.81    0.93    6.39
12.83  13.27
 Exhst NOX:  1.67    2.00    2.12    2.04    6.56    1.42    1.64   17.13
 1.01   2.08

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
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year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV    LDDT    HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 41.0   41.0   41.0           41.0   41.0   41.0   41.0
 41.0
   VMT Mix:  0.854  0.062  0.032          0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.96   2.17   2.42   2.25   4.77   0.37   0.52   1.56
10.25   2.04
 Exhst  HC:  0.88   1.08   1.22   1.13   1.45   0.37   0.52   1.56
2.07    0.93
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.26   0.21   0.27   0.23   0.53
        0.25
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 12.76  14.84  16.23  15.31  41.21   0.80   0.91   6.30
12.51  13.08
 Exhst NOX:  1.67   2.00   2.13   2.04   6.61   1.43   1.65  17.29
 1.01   2.09

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV    LDDT    HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 42.0   42.0   42.0           42.0   42.0   42.0   42.0
 42.0
   VMT Mix:  0.854  0.062  0.032          0.013  0.012  0.001  0.021
```

APP C.2-3-10

```
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.94   2.14   2.40   2.23   4.72   0.36   0.51   1.53
10.22   2.01
 Exhst  HC:  0.87   1.06   1.20   1.11   1.41   0.36   0.51   1.53
2.04    0.91
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.24   0.20   0.26   0.22   0.51
        0.24
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 12.58  14.68  16.02  15.14  40.94   0.79   0.90   6.22
12.23  12.90
 Exhst NOX:  1.67   2.01   2.13   2.05   6.66   1.45   1.67  17.48
 1.02   2.10

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 43.0   43.0   43.0          43.0   43.0   43.0   43.0
 43.0
   VMT Mix:  0.854  0.062  0.032        0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.91   2.12   2.37   2.21   4.66   0.35   0.50   1.50
10.20   1.99
 Exhst  HC:  0.85   1.05   1.18   1.09   1.38   0.35   0.50   1.50
2.02    0.90
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.23   0.20   0.25   0.22   0.49
        0.22
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 12.41  14.53  15.84  14.98  40.76   0.78   0.89   6.15
11.96  12.73
```

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  Exhst NOX:  1.68   2.01   2.14   2.06   6.71   1.47   1.69  17.70
  1.02   2.11

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.854  0.062  0.032        0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88   2.10   2.35   2.18   4.61   0.35   0.49   1.48
10.18   1.96
 Exhst  HC:  0.84   1.04   1.16   1.08   1.34   0.35   0.49   1.48
 2.00   0.88
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.22   0.19   0.25   0.21   0.48
        0.21
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 12.25  14.40  15.66  14.83  40.66   0.78   0.89   6.10
11.73  12.58
 Exhst NOX:  1.68   2.02   2.14   2.06   6.76   1.49   1.72  17.95
 1.03   2.12

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

```
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______

______ ______
 Veh. Spd.: 45.0   45.0   45.0          45.0   45.0   45.0   45.0
 45.0
   VMT Mix:  0.854  0.062  0.032         0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.86   2.08   2.32   2.16   4.57   0.34   0.48   1.45
10.16   1.94
 Exhst  HC:  0.83   1.02   1.15   1.07   1.31   0.34   0.48   1.45
 1.98   0.87
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.21   0.19   0.24   0.20   0.46
         0.20
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 12.10  14.28  15.50  14.69  40.66   0.77   0.88   6.06
11.51  12.43
 Exhst NOX:  1.69   2.03   2.15   2.07   6.81   1.51   1.74  18.22
 1.04   2.13

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______

______ ______
 Veh. Spd.: 46.0   46.0   46.0          46.0   46.0   46.0   46.0
 46.0
   VMT Mix:  0.854  0.062  0.032         0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.83   2.06   2.30   2.15   4.52   0.34   0.47   1.43
10.14   1.91
 Exhst  HC:  0.81   1.01   1.13   1.05   1.28   0.34   0.47   1.43
 1.96   0.85
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
```

HFP C-2-3-13

U4 MINOR ARTERY ~~COLLECTOR~~ MOBILE5a INPUTS 1990 10/4/93

```
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1          TAMFLG - default tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG -          vehicle mix -state

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.840.076.039.013.012.001.015.004
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
```

```
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1       .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
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,HP C-2-4-2

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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
00000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000
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477 C-2-4-3

```
   U4 MINOR ARTERY MOBILE5a INPUTS 1990  10/4/93
1            MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):             1983
     Pre-1981 MYR stringency rate:        12%
     First model year covered:           1976
     Last model year covered:            2020
     Waiver rate (pre-1981):               1.%
     Waiver rate (1981 and newer):         1.%
     Compliance Rate:                    80.%
     Inspection type:                       Computerized Test and
Repair
     Inspection frequency                Annual
     Vehicle types covered:              LDGV - Yes
                                        LDGT1 - Yes
                                        LDGT2 - Yes
                                         HDGV - No
     1981 & later MYR test type:         Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                    Minimum Temp: 68. (F)  Maximum Temp: 94. (F)
                    Period 1 RVP: 11.5      Period 2 RVP:  8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                     I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.81  42.13   1.46   2.05   6.19
26.55  22.35
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46   2.05   6.19
18.37  10.29
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
```

APP C-2-4-4

```
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.43    0.32    0.40    0.34    0.79
        0.41
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 16.17   18.35   20.23   18.99   53.03    1.07    1.22    8.43
18.57  16.67
 Exhst NOX:  1.61    1.90    2.02    1.94    6.02    1.40    1.62   16.94
 0.90   1.93

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low              Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ ______
 Veh. Spd.: 30.0    30.0   30.0           30.0    30.0    30.0    30.0
 30.0
   VMT Mix:  0.840  0.076  0.039          0.013   0.012   0.001   0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.37    2.53    2.85    2.64    5.76    0.48    0.67    2.02
10.78   2.45
 Exhst  HC:  1.14    1.35    1.53    1.41    2.21    0.48    0.67    2.02
 2.60   1.19
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.41    0.31    0.38    0.33    0.76
        0.39
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 15.78   17.93   19.76   18.55   51.30    1.04    1.18    8.14
17.86  16.26
 Exhst NOX:  1.62    1.91    2.03    1.95    6.07    1.40    1.61   16.84
 0.91   1.94

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
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APP C-2-4-5

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0Cal. Year: 1990              Region: Low                Altitude:  500.
Ft.
                          I/M Program: Yes         Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 31.0   31.0   31.0           31.0    31.0    31.0    31.0
 31.0
   VMT Mix:  0.840  0.076  0.039          0.013   0.012   0.001   0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.33   2.49   2.80   2.59    5.64    0.46    0.65    1.96
10.72   2.40
 Exhst  HC:  1.11   1.32   1.49   1.38    2.11    0.46    0.65    1.96
2.54    1.16
 Evap.  HC:  0.55   0.56   0.62   0.58    2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24    0.41
        0.19
 Runing HC:  0.40   0.30   0.37   0.32    0.74
        0.38
 Rsting HC:  0.09   0.08   0.07   0.08    0.09
 0.56   0.09
 Exhst  CO: 15.41  17.54  19.32  18.15   49.74    1.00    1.14    7.88
17.19  15.87
 Exhst NOX:  1.62   1.92   2.04   1.97    6.12    1.39    1.60   16.76
 0.93   1.94

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low                Altitude:  500.
Ft.
                          I/M Program: Yes         Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 32.0   32.0   32.0           32.0    32.0    32.0    32.0
 32.0
   VMT Mix:  0.840  0.076  0.039          0.013   0.012   0.001   0.015
0.004
0Composite Emission Factors (Gm/Mile)
```

App C-2-4-6

```
 VOC     HC:  2.28    2.45    2.75    2.55    5.52    0.45    0.63    1.91
10.66    2.36
 Exhst   HC:  1.08    1.29    1.46    1.34    2.02    0.45    0.63    1.91
2.48     1.13
 Evap.   HC:  0.55    0.56    0.62    0.58    2.30
  7.62    0.59
 Refuel HC:   0.19    0.24    0.24    0.24    0.41
          0.19
 Runing HC:   0.38    0.29    0.36    0.31    0.71
          0.36
 Rsting HC:   0.09    0.08    0.07    0.08    0.09
  0.56    0.09
 Exhst   CO: 15.06   17.17   18.91   17.76   48.33    0.97    1.11    7.65
16.56   15.51
 Exhst NOX:   1.63    1.93    2.05    1.98    6.17    1.38    1.60   16.71
0.94     1.95

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low              Altitude:   500.
Ft.
                           I/M Program: Yes       Ambient Temp:    87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+              ______  ______  ______  ______  ______  ______  ______  ______
______  ______
 Veh. Spd.: 33.0    33.0    33.0            33.0    33.0    33.0    33.0
 33.0
   VMT Mix:  0.840  0.076  0.039           0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  2.24    2.41    2.71    2.51    5.41    0.44    0.62    1.86
10.60    2.32
 Exhst   HC:  1.05    1.26    1.42    1.31    1.93    0.44    0.62    1.86
2.42     1.10
 Evap.   HC:  0.55    0.56    0.62    0.58    2.30
  7.62    0.59
 Refuel HC:   0.19    0.24    0.24    0.24    0.41
          0.19
 Runing HC:   0.36    0.28    0.35    0.30    0.69
          0.35
 Rsting HC:   0.09    0.08    0.07    0.08    0.09
  0.56    0.09
 Exhst   CO: 14.73   16.83   18.53   17.40   47.07    0.95    1.08    7.43
15.97   15.18
 Exhst NOX:   1.63    1.94    2.06    1.98    6.22    1.38    1.60   16.68
 0.95    1.95
```

App C-2-4-7

```
 Veh. Spd.: 35.0   35.0   35.0          35.0   35.0   35.0   35.0
 35.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.16   2.34   2.62   2.43   5.22   0.42   0.59   1.77
10.49   2.24
 Exhst  HC:  1.00   1.20   1.36   1.26   1.78   0.42   0.59   1.77
2.31   1.05
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.34   0.26   0.33   0.28   0.64
        0.32
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 14.14  16.20  17.83  16.76  44.93   0.90   1.02   7.05
14.90   14.57
 Exhst NOX:  1.64   1.96   2.08   2.00   6.31   1.38   1.60  16.69
 0.97   1.96

----------------------------------------------------------------
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:  87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ------ ------ ------ ------ ------ ------ ------ ------
------ ------
 Veh. Spd.: 36.0   36.0   36.0          36.0   36.0   36.0   36.0
 36.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.12   2.30   2.58   2.40   5.13   0.41   0.57   1.73
10.44   2.20
 Exhst  HC:  0.98   1.18   1.33   1.23   1.71   0.41   0.57   1.73
2.26   1.03
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.32   0.25   0.32   0.27   0.62
        0.31
 Veh. Spd.: 35.0   35.0   35.0            35.0   35.0   35.0   35.0
 35.0
   VMT Mix:  0.840  0.076  0.039          0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.16   2.34   2.62   2.43    5.22   0.42   0.59   1.77
10.49   2.24
 Exhst  HC:  1.00   1.20   1.36   1.26    1.78   0.42   0.59   1.77
2.31    1.05
 Evap.  HC:  0.55   0.56   0.62   0.58    2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24    0.41
        0.19
 Runing HC:  0.34   0.26   0.33   0.28    0.64
        0.32
 Rsting HC:  0.09   0.08   0.07   0.08    0.09
 0.56   0.09
 Exhst  CO: 14.14  16.20  17.83  16.76   44.93   0.90   1.02   7.05
14.90  14.57
 Exhst NOX:  1.64   1.96   2.08   2.00    6.31   1.38   1.60  16.69
 0.97   1.96

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                          I/M Program: Yes      Ambient Temp:  87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______

 Veh. Spd.: 36.0   36.0   36.0            36.0   36.0   36.0   36.0
 36.0
   VMT Mix:  0.840  0.076  0.039          0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.12   2.30   2.58   2.40    5.13   0.41   0.57   1.73
10.44   2.20
 Exhst  HC:  0.98   1.18   1.33   1.23    1.71   0.41   0.57   1.73
2.26    1.03
 Evap.  HC:  0.55   0.56   0.62   0.58    2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24    0.41
        0.19
 Runing HC:  0.32   0.25   0.32   0.27    0.62
        0.31
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 13.87   15.93   17.51   16.46   44.05    0.88    1.00    6.89
14.42  14.29
 Exhst NOX:  1.65    1.97    2.09    2.01    6.36    1.39    1.60   16.73
 0.98   1.97

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
_____  ______
 Veh. Spd.: 37.0   37.0   37.0            37.0    37.0    37.0    37.0
 37.0
   VMT Mix:  0.840  0.076  0.039          0.013   0.012   0.001   0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09    2.27    2.55    2.37    5.05    0.40    0.56    1.69
10.39   2.16
 Exhst  HC:  0.96    1.16    1.31    1.21    1.65    0.40    0.56    1.69
 2.22   1.00
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.31    0.24    0.31    0.26    0.60
         0.30
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 13.62   15.67   17.22   16.20   43.28    0.86    0.98    6.74
13.97  14.03
 Exhst NOX:  1.65    1.98    2.10    2.02    6.41    1.39    1.61   16.79
 0.99   1.98

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
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ATP C 2-4-10

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                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+               ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 38.0   38.0   38.0          38.0   38.0   38.0   38.0
 38.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.06   2.24   2.51   2.33   4.97   0.39   0.55   1.65
10.35   2.13
 Exhst  HC:  0.94   1.13   1.28   1.18   1.60   0.39   0.55   1.65
 2.17   0.98
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.29   0.23   0.30   0.25   0.58
        0.28
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 13.38  15.43  16.94  15.95  42.61   0.84   0.96   6.61
13.56  13.79
 Exhst NOX:  1.66   1.98   2.10   2.02   6.46   1.40   1.62  16.88
 0.99   1.98

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+               ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 39.0   39.0   39.0          39.0   39.0   39.0   39.0
 39.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.02   2.22   2.48   2.31   4.90   0.38   0.54   1.62
10.31   2.10
 Exhst  HC:  0.92   1.11   1.26   1.16   1.54   0.38   0.54   1.62
 2.14   0.96
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.28   0.23   0.29   0.25   0.56
        0.27
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 13.16  15.22  16.69  15.72  42.05   0.83   0.94   6.49
13.18  13.57
 Exhst NOX:  1.66   1.99   2.11   2.03   6.51   1.41   1.63  16.99
 1.00   1.99

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:  20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.840  0.076  0.039        0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.99   2.19   2.45   2.28   4.83   0.37   0.53   1.59
10.28   2.07
 Exhst  HC:  0.90   1.10   1.24   1.14   1.50   0.37   0.53   1.59
2.10   0.94
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.27   0.22   0.28   0.24   0.54
        0.26
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 12.95  15.02  16.45  15.51  41.58   0.81   0.93   6.39
12.83  13.36
 Exhst NOX:  1.67   2.00   2.12   2.04   6.56   1.42   1.64  17.13
 1.01   2.00

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0Emission factors are as of July 1st of the indicated calendar
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 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.28    0.23    0.29    0.25    0.56
         0.27
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 13.16   15.22   16.69   15.72   42.05    0.83    0.94    6.49
13.18  13.57
 Exhst NOX:  1.66    1.99    2.11    2.03    6.51    1.41    1.63   16.99
 1.00   1.99

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low               Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:    87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+              ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 40.0   40.0   40.0           40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.840  0.076  0.039          0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.99    2.19    2.45    2.28    4.83    0.37    0.53    1.59
10.28   2.07
 Exhst  HC:  0.90    1.10    1.24    1.14    1.50    0.37    0.53    1.59
 2.10   0.94
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.27    0.22    0.28    0.24    0.54
         0.26
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 12.95   15.02   16.45   15.51   41.58    0.81    0.93    6.39
12.83  13.36
 Exhst NOX:  1.67    2.00    2.12    2.04    6.56    1.42    1.64   17.13
 1.01   2.00

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
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 Exhst NOX:  1.68   2.01   2.14   2.06   6.71   1.47   1.69  17.70
 1.02   2.02

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC   HC:  1.88   2.10   2.35   2.18   4.61   0.35   0.49   1.48
10.18   1.96
 Exhst  HC:  0.84   1.04   1.16   1.08   1.34   0.35   0.49   1.48
 2.00   0.88
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.22   0.19   0.25   0.21   0.48
        0.21
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 12.25  14.40  15.66  14.83  40.66   0.78   0.89   6.10
11.73  12.67
 Exhst NOX:  1.68   2.02   2.14   2.06   6.76   1.49   1.72  17.95
 1.03   2.03

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

```
  U5 URBAN COLLECTOR MOBILE5a INPUTS 1990  10/4/93
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1          TAMFLG - default tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG -          vehicle mix-state

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.845.076.039.010.012.001.012.005
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
```

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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1      .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
```

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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
0000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000
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   U5 URBAN COLLECTOR MOBILE5a OUTPUT 1990 10/4/93
1            MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                1983
     Pre-1981 MYR stringency rate:           12%
     First model year covered:              1976
     Last model year covered:               2020
     Waiver rate (pre-1981):                 1.%
     Waiver rate (1981 and newer):           1.%
     Compliance Rate:                       80.%
     Inspection type:                          Computerized Test and
Repair
     Inspection frequency                   Annual
     Vehicle types covered:                 LDGV - Yes
                                           LDGT1 - Yes
                                           LDGT2 - Yes
                                            HDGV - No
     1981 & later MYR test type:            Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 68. (F)  Maximum Temp: 94. (F)
                     Period 1 RVP: 11.5       Period 2 RVP:  8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0________________________________________________________________
________________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix: 0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.81  42.13   1.46   2.05   6.19
26.55  22.35
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46   2.05   6.19
18.37  10.29
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
```

MPC 2-5-4

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 ______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                     I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            _____  _____  _____  _____  _____  _____  _____  _____
 _____  _____
 Veh. Spd.: 24.0   24.0   24.0          24.0   24.0   24.0   24.0
 24.0
   VMT Mix:  0.845  0.076  0.039        0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.72   2.86   3.24   2.99   6.77   0.57   0.81   2.44
11.25   2.80
 Exhst  HC:  1.37   1.61   1.83   1.68   3.02   0.57   0.81   2.44
 3.07   1.43
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.52   0.38   0.48   0.42   0.96
        0.50
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 18.60  20.86  23.08  21.62  64.67   1.31   1.49  10.28
22.80  19.10
 Exhst NOX:  1.58   1.83   1.95   1.87   5.77   1.48   1.71  17.85
 0.83   1.85

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                     I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            _____  _____  _____  _____  _____  _____  _____  _____
 _____  _____
 Veh. Spd.: 25.0   25.0   25.0          25.0   25.0   25.0   25.0
```

APP C 2-5-5

```
25.0
  VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.65   2.80   3.17   2.92   6.57   0.55   0.78   2.36
11.16   2.73
 Exhst  HC:  1.32   1.56   1.77   1.63   2.85   0.55   0.78   2.36
 2.98   1.39
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.50   0.37   0.46   0.40   0.92
        0.48
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 18.04  20.30  22.43  21.02  61.88   1.25   1.43   9.85
21.85  18.53
 Exhst NOX:  1.59   1.85   1.97   1.89   5.82   1.46   1.69  17.61
 0.84   1.85

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 26.0   26.0   26.0          26.0   26.0   26.0   26.0
 26.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.59   2.74   3.10   2.86   6.38   0.54   0.76   2.28
11.08   2.67
 Exhst  HC:  1.28   1.51   1.72   1.58   2.70   0.54   0.76   2.28
 2.90   1.34
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.48   0.35   0.44   0.38   0.89
        0.46
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
```

```
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 28.0   28.0   28.0           28.0   28.0   28.0   28.0
 28.0
   VMT Mix:  0.845  0.076  0.039          0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.47   2.63   2.97   2.74   6.05   0.50   0.71   2.14
10.93   2.55
 Exhst  HC:  1.20   1.43   1.62   1.49   2.43   0.50   0.71   2.14
 2.75   1.26
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.45   0.33   0.41   0.36   0.82
        0.43
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 16.59  18.80  20.73  19.45  54.93   1.11   1.27   8.74
19.32  17.02
 Exhst NOX:  1.61   1.89   2.01   1.93   5.97   1.42   1.63  17.07
 0.89   1.87

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 29.0   29.0   29.0           29.0   29.0   29.0   29.0
 29.0
   VMT Mix:  0.845  0.076  0.039          0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.42   2.58   2.91   2.69   5.90   0.49   0.69   2.08
10.85   2.50
 Exhst  HC:  1.17   1.39   1.57   1.45   2.32   0.49   0.69   2.08
2.67    1.22
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
  Refuel HC:  0.19    0.24    0.24    0.24    0.41
          0.19
  Runing HC:  0.43    0.32    0.40    0.34    0.79
          0.41
  Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56    0.09
  Exhst  CO: 16.17   18.35   20.23   18.99   53.03    1.07    1.22    8.43
18.57   16.59
  Exhst NOX:  1.61    1.90    2.02    1.94    6.02    1.40    1.62   16.94
  0.90    1.87

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low              Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 30.0   30.0   30.0          30.0   30.0   30.0   30.0
 30.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.37    2.53    2.85    2.64    5.76    0.48    0.67    2.02
10.78    2.45
 Exhst  HC:  1.14    1.35    1.53    1.41    2.21    0.48    0.67    2.02
 2.60    1.19
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62    0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.41    0.31    0.38    0.33    0.76
         0.39
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56    0.09
 Exhst  CO: 15.78   17.93   19.76   18.55   51.30    1.04    1.18    8.14
17.86   16.18
 Exhst NOX:  1.62    1.91    2.03    1.95    6.07    1.40    1.61   16.84
 0.91    1.88

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
```

App C-2-5-8

```
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 31.0   31.0   31.0          31.0   31.0   31.0   31.0
 31.0
   VMT Mix: 0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.33   2.49   2.80   2.59   5.64   0.46   0.65   1.96
10.72   2.40
 Exhst  HC:  1.11   1.32   1.49   1.38   2.11   0.46   0.65   1.96
2.54    1.16
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.40   0.30   0.37   0.32   0.74
        0.38
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 15.41  17.54  19.32  18.15  49.74   1.00   1.14   7.88
17.19  15.80
 Exhst NOX:  1.62   1.92   2.04   1.97   6.12   1.39   1.60  16.76
 0.93   1.88

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 32.0   32.0   32.0          32.0   32.0   32.0   32.0
 32.0
   VMT Mix: 0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
```

App C-2-5-9

```
 VOC    HC:  2.28    2.45    2.75    2.55    5.52    0.45    0.63    1.91
10.66   2.36
 Exhst  HC:  1.08    1.29    1.46    1.34    2.02    0.45    0.63    1.91
2.48    1.13
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.38    0.29    0.36    0.31    0.71
        0.36
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 15.06   17.17   18.91   17.76   48.33    0.97    1.11    7.65
16.56  15.44
 Exhst NOX:  1.63    1.93    2.05    1.98    6.17    1.38    1.60   16.71
 0.94   1.89

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
               Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 33.0   33.0   33.0          33.0   33.0   33.0   33.0
 33.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.24    2.41    2.71    2.51    5.41    0.44    0.62    1.86
10.60   2.32
 Exhst  HC:  1.05    1.26    1.42    1.31    1.93    0.44    0.62    1.86
 2.42   1.10
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.36    0.28    0.35    0.30    0.69
        0.35
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 14.73   16.83   18.53   17.40   47.07    0.95    1.08    7.43
15.97  15.10
 Exhst NOX:  1.63    1.94    2.06    1.98    6.22    1.38    1.60   16.68
 0.95   1.89
```

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_____________________________________________________________________

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low             Altitude:  500.
Ft.
                        I/M Program: Yes          Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.20   2.37   2.66   2.47   5.31   0.43   0.60   1.81
10.54   2.28
 Exhst  HC:  1.02   1.23   1.39   1.28   1.85   0.43   0.60   1.81
 2.36   1.07
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.35   0.27   0.34   0.29   0.66
        0.34
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 14.43  16.50  18.17  17.07  45.94   0.92   1.05   7.23
15.42  14.79
 Exhst NOX:  1.64   1.95   2.07   1.99   6.27   1.38   1.59  16.67
 0.96   1.90

_____________________________________________________________________

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low             Altitude:  500.
Ft.
                        I/M Program: Yes          Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
```

```
 Veh. Spd.: 35.0    35.0    35.0              35.0    35.0    35.0    35.0
 35.0
   VMT Mix:  0.845   0.076   0.039            0.010   0.012   0.001   0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.16    2.34    2.62    2.43    5.22    0.42    0.59    1.77
10.49   2.24
 Exhst  HC:  1.00    1.20    1.36    1.26    1.78    0.42    0.59    1.77
2.31    1.05
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.34    0.26    0.33    0.28    0.64
        0.32
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 14.14   16.20   17.83   16.76   44.93    0.90    1.02    7.05
14.90  14.50
 Exhst NOX:  1.64    1.96    2.08    2.00    6.31    1.38    1.60   16.69
 0.97   1.90

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                     I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+

 Veh. Spd.: 36.0    36.0    36.0              36.0    36.0    36.0    36.0
 36.0
   VMT Mix:  0.845   0.076   0.039            0.010   0.012   0.001   0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.12    2.30    2.58    2.40    5.13    0.41    0.57    1.73
10.44   2.20
 Exhst  HC:  0.98    1.18    1.33    1.23    1.71    0.41    0.57    1.73
2.26    1.02
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.32    0.25    0.32    0.27    0.62
        0.31
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56    0.09
 Exhst  CO: 13.87   15.93   17.51   16.46   44.05    0.88    1.00    6.89
14.42   14.22
 Exhst NOX:  1.65    1.97    2.09    2.01    6.36    1.39    1.60   16.73
 0.98    1.91
```

```
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:    87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:    20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV    LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 37.0    37.0   37.0           37.0   37.0   37.0   37.0
 37.0
   VMT Mix:  0.845  0.076  0.039          0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09    2.27    2.55    2.37    5.05    0.40    0.56    1.69
10.39    2.17
 Exhst  HC:  0.96    1.16    1.31    1.21    1.65    0.40    0.56    1.69
 2.22    1.00
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.31    0.24    0.31    0.26    0.60
         0.30
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56    0.09
 Exhst  CO: 13.62   15.67   17.22   16.20   43.28    0.86    0.98    6.74
13.97   13.97
 Exhst NOX:  1.65    1.98    2.10    2.02    6.41    1.39    1.61   16.79
 0.99    1.92
```

```
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:    87.8
/ 87.8 / 87.8 F
```

App C. 2-5-13

```
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 38.0   38.0   38.0            38.0    38.0    38.0    38.0
 38.0
   VMT Mix:  0.845  0.076  0.039          0.010   0.012   0.001   0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.06   2.24   2.51   2.33    4.97    0.39    0.55    1.65
10.35   2.13
 Exhst  HC:  0.94   1.13   1.28   1.18    1.60    0.39    0.55    1.65
2.17    0.98
 Evap.  HC:  0.55   0.56   0.62   0.58    2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24    0.41
        0.19
 Runing HC:  0.29   0.23   0.30   0.25    0.58
        0.28
 Rsting HC:  0.09   0.08   0.07   0.08    0.09
 0.56   0.09
 Exhst  CO: 13.38  15.43  16.94  15.95   42.61    0.84    0.96    6.61
13.56  13.73
 Exhst NOX:  1.66   1.98   2.10   2.02    6.46    1.40    1.62   16.88
 0.99   1.92

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 39.0   39.0   39.0            39.0    39.0    39.0    39.0
 39.0
   VMT Mix:  0.845  0.076  0.039          0.010   0.012   0.001   0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.02   2.22   2.48   2.31    4.90    0.38    0.54    1.62
10.31   2.10
 Exhst  HC:  0.92   1.11   1.26   1.16    1.54    0.38    0.54    1.62
 2.14   0.96
```

APP C-2-5-14

```
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.28   0.23   0.29   0.25   0.56
         0.27
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 13.16  15.22  16.69  15.72  42.05   0.83   0.94   6.49
13.18  13.50
 Exhst NOX:  1.66   1.99   2.11   2.03   6.51   1.41   1.63  16.99
 1.00   1.93

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____  ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.845  0.076  0.039        0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.99   2.19   2.45   2.28   4.83   0.37   0.53   1.59
10.28   2.07
 Exhst  HC:  0.90   1.10   1.24   1.14   1.50   0.37   0.53   1.59
 2.10   0.94
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.27   0.22   0.28   0.24   0.54
         0.26
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 12.95  15.02  16.45  15.51  41.58   0.81   0.93   6.39
12.83  13.30
 Exhst NOX:  1.67   2.00   2.12   2.04   6.56   1.42   1.64  17.13
 1.01   1.94

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
```

```
  U6 LOCAL MOBILE5a INPUTS 1990   10/4/93
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1          TAMFLG - [illegible] tampering rates-default

1          SPDFLG - one speed per scenario
3          VMFLAG - [illegible] vehicle mix-state

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                  PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.845.076.039.010.012.001.012.005
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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AP 5.2-6-1

```
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1       .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
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AP c-26-2

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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
00000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000
```

HP c.2-6-3

```
   U6 LOCAL  MOBILE5a OUTPUT 1990 10/4/93
1          MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                 1983
     Pre-1981 MYR stringency rate:            12%
     First model year covered:               1976
     Last model year covered:                2020
     Waiver rate (pre-1981):                   1.%
     Waiver rate (1981 and newer):             1.%
     Compliance Rate:                         80.%
     Inspection type:                           Computerized Test and
Repair
     Inspection frequency                    Annual
     Vehicle types covered:                  LDGV - Yes
                                            LDGT1 - Yes
                                            LDGT2 - Yes
                                             HDGV - No
     1981 & later MYR test type:             Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 68. (F)   Maximum Temp: 94. (F)
                     Period 1 RVP: 11.5       Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
  VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.81  42.13   1.46   2.05   6.19
26.55  22.35
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46   2.05   6.19
18.37  10.29
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
```

AP c-2-6-4

```
 Runing HC:  0.68    0.49    0.61    0.53    1.22
        0.65
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 22.24   24.34   27.25   25.33   83.33    1.67    1.91   13.13
28.83  22.86
 Exhst NOX:  1.55    1.75    1.87    1.79    5.53    1.61    1.86   19.47
 0.75   1.83

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low              Altitude:  500.
Ft.
                       I/M Program: Yes         Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______  ______
 Veh. Spd.: 20.0    20.0    20.0            20.0    20.0    20.0    20.0
 20.0
   VMT Mix:  0.845  0.076  0.039           0.010   0.012   0.001   0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  3.04    3.17    3.61    3.32    7.78    0.66    0.93    2.81
11.67   3.13
 Exhst  HC:  1.60    1.85    2.10    1.93    3.85    0.66    0.93    2.81
 3.49   1.67
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.62    0.45    0.57    0.49    1.14
        0.59
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 21.33   23.53   26.26   24.45   78.86    1.59    1.81   12.46
27.41  21.93
 Exhst NOX:  1.55    1.76    1.88    1.80    5.58    1.58    1.83   19.08
 0.76   1.82

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low              Altitude:  500.
Ft.
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AP 6·2-6-5

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_______________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 24.0   24.0   24.0          24.0   24.0   24.0   24.0
 24.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.72   2.86   3.24   2.99   6.77   0.57   0.81   2.44
11.25   2.80
 Exhst  HC:  1.37   1.61   1.83   1.68   3.02   0.57   0.81   2.44
 3.07   1.43
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.52   0.38   0.48   0.42   0.96
        0.50
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 18.60  20.86  23.08  21.62  64.67   1.31   1.49  10.28
22.80  19.10
 Exhst NOX:  1.58   1.83   1.95   1.87   5.77   1.48   1.71  17.85
 0.83   1.85

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 25.0   25.0   25.0          25.0   25.0   25.0   25.0
```

HP -2-6-6

```
 25.0
   VMT Mix:  0.845  0.076  0.039          0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.65   2.80   3.17   2.92   6.57   0.55   0.78   2.36
11.16   2.73
 Exhst  HC:  1.32   1.56   1.77   1.63   2.85   0.55   0.78   2.36
2.98   1.39
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.50   0.37   0.46   0.40   0.92
        0.48
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 18.04  20.30  22.43  21.02  61.88   1.25   1.43   9.85
21.85  18.53
 Exhst NOX:  1.59   1.85   1.97   1.89   5.82   1.46   1.69  17.61
 0.84   1.85

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:  20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 26.0   26.0   26.0          26.0   26.0   26.0   26.0
 26.0
   VMT Mix:  0.845  0.076  0.039          0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.59   2.74   3.10   2.86   6.38   0.54   0.76   2.28
11.08   2.67
 Exhst  HC:  1.28   1.51   1.72   1.58   2.70   0.54   0.76   2.28
 2.90   1.34
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.48   0.35   0.44   0.38   0.89
        0.46
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
```

AP C-2-6-7

```
 Exhst  CO: 17.52  19.77  21.82  20.47  59.34   1.20   1.37   9.44
20.96  17.99
 Exhst NOX:  1.59   1.86   1.98   1.90   5.87   1.44   1.67  17.40
 0.86   1.86

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:   500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 27.0   27.0   27.0          27.0   27.0   27.0   27.0
 27.0
  VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.53   2.68   3.03   2.80   6.21   0.52   0.73   2.21
11.00   2.61
 Exhst  HC:  1.24   1.47   1.67   1.53   2.56   0.52   0.73   2.21
 2.82   1.30
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.46   0.34   0.43   0.37   0.85
        0.44
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 17.04  19.27  21.26  19.94  57.03   1.16   1.32   9.08
20.11  17.49
 Exhst NOX:  1.60   1.88   2.00   1.92   5.92   1.43   1.65  17.23
 0.87   1.86

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____________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:   500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
```

AP C-2-6-8

```
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 28.0   28.0   28.0           28.0   28.0   28.0   28.0
 28.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.47   2.63   2.97   2.74   6.05   0.50   0.71   2.14
10.93   2.55
 Exhst  HC:  1.20   1.43   1.62   1.49   2.43   0.50   0.71   2.14
 2.75   1.26
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.45   0.33   0.41   0.36   0.82
        0.43
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 16.59  18.80  20.73  19.45  54.93   1.11   1.27   8.74
19.32  17.02
 Exhst NOX:  1.61   1.89   2.01   1.93   5.97   1.42   1.63  17.07
 0.89   1.87

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                         I/M Program: Yes        Ambient Temp:  87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:  20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 29.0   29.0   29.0           29.0   29.0   29.0   29.0
 29.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.42   2.58   2.91   2.69   5.90   0.49   0.69   2.08
10.85   2.50
 Exhst  HC:  1.17   1.39   1.57   1.45   2.32   0.49   0.69   2.08
 2.67   1.22
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
```

AP C.2-6-9

```
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.43    0.32    0.40    0.34    0.79
        0.41
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 16.17   18.35   20.23   18.99   53.03    1.07    1.22    8.43
18.57   16.59
 Exhst NOX:  1.61    1.90    2.02    1.94    6.02    1.40    1.62   16.94
 0.90   1.87

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____________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low             Altitude:   500.
Ft.
                      I/M Program: Yes        Ambient Temp:    87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 30.0   30.0   30.0           30.0    30.0    30.0    30.0
 30.0
   VMT Mix:  0.845  0.076  0.039          0.010   0.012   0.001   0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.37    2.53    2.85    2.64    5.76    0.48    0.67    2.02
10.78   2.45
 Exhst  HC:  1.14    1.35    1.53    1.41    2.21    0.48    0.67    2.02
 2.60   1.19
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.41    0.31    0.38    0.33    0.76
        0.39
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 15.78   17.93   19.76   18.55   51.30    1.04    1.18    8.14
17.86   16.18
 Exhst NOX:  1.62    1.91    2.03    1.95    6.07    1.40    1.61   16.84
 0.91   1.88

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
```

AP C-2-6-10

```
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 31.0   31.0   31.0          31.0   31.0   31.0   31.0
 31.0
   VMT Mix:  0.845  0.076  0.039        0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.33   2.49   2.80   2.59   5.64   0.46   0.65   1.96
10.72   2.40
 Exhst  HC:  1.11   1.32   1.49   1.38   2.11   0.46   0.65   1.96
 2.54   1.16
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.40   0.30   0.37   0.32   0.74
        0.38
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 15.41  17.54  19.32  18.15  49.74   1.00   1.14   7.88
17.19  15.80
 Exhst NOX:  1.62   1.92   2.04   1.97   6.12   1.39   1.60  16.76
 0.93   1.88

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______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 32.0   32.0   32.0          32.0   32.0   32.0   32.0
 32.0
   VMT Mix:  0.845  0.076  0.039        0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
```

```
  VOC     HC:  2.28    2.45    2.75    2.55    5.52    0.45    0.63    1.91
10.66   2.36
  Exhst   HC:  1.08    1.29    1.46    1.34    2.02    0.45    0.63    1.91
 2.48   1.13
  Evap.   HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
  Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
  Runing HC:  0.38    0.29    0.36    0.31    0.71
         0.36
  Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
  Exhst  CO: 15.06   17.17   18.91   17.76   48.33    0.97    1.11    7.65
16.56  15.44
  Exhst NOX:  1.63    1.93    2.05    1.98    6.17    1.38    1.60   16.71
 0.94   1.89

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low              Altitude:  500.
Ft.
                         I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 33.0   33.0   33.0           33.0    33.0    33.0    33.0
 33.0
   VMT Mix:  0.845  0.076  0.039          0.010   0.012   0.001   0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  2.24    2.41    2.71    2.51    5.41    0.44    0.62    1.86
10.60   2.32
 Exhst   HC:  1.05    1.26    1.42    1.31    1.93    0.44    0.62    1.86
2.42    1.10
 Evap.   HC:  0.55    0.56    0.62    0.58    2.30
 7.62    0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.36    0.28    0.35    0.30    0.69
        0.35
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56    0.09
 Exhst  CO: 14.73   16.83   18.53   17.40   47.07    0.95    1.08    7.43
15.97   15.10
 Exhst NOX:  1.63    1.94    2.06    1.98    6.22    1.38    1.60   16.68
 0.95    1.89
```

AP C.2-6-12

R-1 INTERSTATE

```
1            PROMPT - vertical flag input, no prompting
             MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1            TAMFLG - default tampering rates

1            SPDFLG - one speed per scenario
3            VMFLAG -           vehicle mix-state

3           MYMRFG - local registration and default mileage accrual
rates
1            NEWFLG - default exhaust emission rates

2            IMFLAG - include I/M program

1            ALHFLG - no additional correction factor inputs

1            ATPFLG - no anti-tampering program

1             RLFLAG - Stage II vapor recovery program not in Base
Year
2           LOCFLG - read in local area parameters one time for all
scenarios
1            TEMFLG - use max/min temps
4            OUTFMT - 80 column descriptive format

4                         PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2            IDLFLG - print idle emissions results

3              NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4            HCFLAG - tot & comps HC

.830.071.037.020.012.001.027.002
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
```

HP C-2-7-1

```
.003 .002 .002 .001 .007                                - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                                   21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                                - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                        .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1              .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
1 90 44.0 85.4 20.6 27.3 20.6 7
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Af   c.2-7-2

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1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
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AP C·2-7-3

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13.61  13.80
 Exhst NOX:  2.30    2.72    2.92    2.79    7.35    1.96    2.26   23.65
 1.33   5.25

_____________________________________________________________________________
_______________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 57.0   57.0   57.0          57.0   57.0   57.0   57.0
 57.0
   VMT Mix:  0.739  0.058  0.030         0.025  0.010  0.001  0.131
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.84    2.12    2.36    2.20    4.22    0.30    0.43    1.29
10.40   1.90
 Exhst  HC:  0.89    1.12    1.26    1.17    1.13    0.30    0.43    1.29
 2.22   0.98
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.56
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.17
 Runing HC:  0.13    0.12    0.16    0.13    0.30
        0.11
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.08
 Exhst  CO: 15.88   19.67   21.37   20.25   48.21    0.82    0.93    6.42
16.25  15.67
 Exhst NOX:  2.37    2.81    3.01    2.88    7.39    2.02    2.34   24.42
 1.37   5.42

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
```

```
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 58.0    58.0    58.0            58.0    58.0    58.0    58.0
 58.0
   VMT Mix:  0.739  0.058  0.030           0.025   0.010   0.001   0.131
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.89    2.18    2.43    2.27    4.21    0.30    0.42    1.28
10.54   1.94
 Exhst  HC:  0.94    1.19    1.34    1.24    1.13    0.30    0.42    1.28
 2.36   1.02
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.56
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.17
 Runing HC:  0.12    0.12    0.15    0.13    0.29
         0.11
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.08
 Exhst  CO: 17.98   22.52   24.51   23.20   49.61    0.83    0.95    6.52
18.89   17.54
 Exhst NOX:  2.44    2.89    3.11    2.97    7.44    2.09    2.42   25.26
 1.40    5.59

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 59.0    59.0    59.0            59.0    59.0    59.0    59.0
 59.0
   VMT Mix:  0.739  0.058  0.030           0.025   0.010   0.001   0.131
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.94    2.25    2.50    2.33    4.20    0.30    0.42    1.28
10.68   1.98
 Exhst  HC:  0.99    1.26    1.42    1.31    1.13    0.30    0.42    1.28
 2.50   1.06
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.56
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
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Af C-2-7-5

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         0.17
 Runing HC:  0.12    0.11    0.15    0.12    0.28
         0.10
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.08
 Exhst  CO: 20.07   25.37   27.66   26.15   51.15    0.85    0.96    6.65
21.53   19.42
 Exhst NOX:  2.52    2.98    3.20    3.06    7.49    2.17    2.50   26.16
 1.44    5.78

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low               Altitude:  500.
Ft.
                         I/M Program: Yes         Ambient Temp:    87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 60.0    60.0    60.0            60.0    60.0    60.0    60.0
 60.0
   VMT Mix:  0.739   0.058   0.030           0.025   0.010   0.001   0.131
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.98    2.31    2.57    2.40    4.19    0.30    0.42    1.27
10.82    2.02
 Exhst  HC:  1.05    1.33    1.50    1.38    1.13    0.30    0.42    1.27
 2.64    1.11
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.56
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.17
 Runing HC:  0.11    0.11    0.14    0.12    0.27
         0.10
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.08
 Exhst  CO: 22.17   28.23   30.80   29.10   52.86    0.86    0.98    6.78
24.17   21.31
 Exhst NOX:  2.59    3.07    3.29    3.14    7.54    2.25    2.60   27.13
 1.47    5.97

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low               Altitude:  500.
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AP C-2-7-6

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      R2 ROADWAY  PRINCIPAL ARTERY MOBILE5a 10/4/93
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1          TAMFLG - default tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG -           vehicle mix-state

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                  PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.830.071.037.020.012.001.027.002
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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A7 C.2-8-1

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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1       .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
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/H C.2-8-2

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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
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   R2 ROADWAY -PRINCIPAL ARTERY
1          MOBILE 5a VOCs 1990 Base Year Emissions Inv. 10/4/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):               1983
     Pre-1981 MYR stringency rate:          12%
     First model year covered:             1976
     Last model year covered:              2020
     Waiver rate (pre-1981):                 1.%
     Waiver rate (1981 and newer):           1.%
     Compliance Rate:                      80.%
     Inspection type:                         Computerized Test and
Repair
     Inspection frequency                  Annual
     Vehicle types covered:                LDGV - Yes
                                          LDGT1 - Yes
                                          LDGT2 - Yes
                                           HDGV - No
     1981 & later MYR test type:           Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 68. (F)  Maximum Temp: 94. (F)
                     Period 1 RVP: 11.5       Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
  VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.82  42.13   1.46   2.05   6.19
26.55   22.29
 Exhst  HC: 10.23  10.61  12.91  11.40  15.14   1.46   2.05   6.19
18.37   10.25
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
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AP C.2-8-4

R-2

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0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.94    2.14    2.40    2.23    4.72    0.36    0.51    1.53
10.22   2.01
 Exhst  HC:  0.87    1.06    1.20    1.11    1.41    0.36    0.51    1.53
 2.04   0.92
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.24    0.20    0.26    0.22    0.51
         0.24
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 12.58   14.68   16.02   15.14   40.94    0.79    0.90    6.22
12.23   13.10
 Exhst NOX:  1.67    2.01    2.13    2.05    6.66    1.45    1.67   17.48
 1.02   2.24

________________________________________________________________________

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes         Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
______  ______
 Veh. Spd.: 43.0    43.0    43.0            43.0    43.0    43.0    43.0
 43.0
   VMT Mix:  0.830   0.071   0.037           0.020   0.012   0.001   0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.91    2.12    2.37    2.21    4.66    0.35    0.50    1.50
10.20   1.98
 Exhst  HC:  0.85    1.05    1.18    1.09    1.38    0.35    0.50    1.50
 2.02   0.90
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.23    0.20    0.25    0.22    0.49
         0.23
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 12.41   14.53   15.84   14.98   40.76    0.78    0.89    6.15
11.96   12.93
```

AP C-2-8-5

R-2

```
 Exhst NOX:  1.68    2.01    2.14    2.06    6.71    1.47    1.69  17.70
 1.02   2.25

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low              Altitude:  500.
Ft.
                      I/M Program: Yes         Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+
           ______  ______  ______  ______  ______  ______  ______  ______
______  ______
 Veh. Spd.: 44.0   44.0   44.0            44.0    44.0    44.0    44.0
 44.0
  VMT Mix:  0.830  0.071  0.037          0.020   0.012   0.001   0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88    2.10    2.35    2.19    4.61    0.35    0.49    1.48
10.18   1.96
 Exhst  HC:  0.84    1.04    1.16    1.08    1.34    0.35    0.49    1.48
2.00    0.89
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.22    0.19    0.25    0.21    0.48
        0.21
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 12.25   14.40   15.66   14.83   40.66    0.78    0.89    6.10
11.73  12.78
 Exhst NOX:  1.68    2.02    2.14    2.06    6.76    1.49    1.72   17.95
 1.03   2.26

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low              Altitude:  500.
Ft.
                      I/M Program: Yes         Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
```

AP c-2-8-6

R-2

```
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 45.0   45.0   45.0          45.0   45.0   45.0   45.0
 45.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.86   2.08   2.32   2.16   4.57   0.34   0.48   1.45
10.16   1.93
 Exhst  HC:  0.83   1.02   1.15   1.07   1.31   0.34   0.48   1.45
 1.98   0.87
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.21   0.19   0.24   0.20   0.46
         0.20
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 12.10  14.28  15.50  14.70  40.66   0.77   0.88   6.06
11.51  12.64
 Exhst NOX:  1.69   2.03   2.15   2.07   6.81   1.51   1.74  18.22
  1.04   2.27


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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 46.0   46.0   46.0          46.0   46.0   46.0   46.0
 46.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.83   2.06   2.30   2.15   4.52   0.34   0.47   1.43
10.14   1.91
 Exhst  HC:  0.81   1.01   1.13   1.05   1.28   0.34   0.47   1.43
 1.96   0.86
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
```

Af c.2-8-7

R-2

```
 Runing HC:  0.20    0.18    0.23    0.20    0.45
       0.19
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56  0.09
 Exhst  CO: 11.95   14.17   15.35   14.57   40.74    0.77    0.87    6.02
11.31  12.51
 Exhst NOX:  1.69    2.03    2.16    2.07    6.85    1.54    1.77   18.53
 1.04   2.29

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:  87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:  20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV   LDGT1   LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
______  ______
 Veh. Spd.: 47.0    47.0    47.0            47.0    47.0    47.0    47.0
 47.0
   VMT Mix:  0.830   0.071   0.037           0.020   0.012   0.001   0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.81    2.05    2.28    2.13    4.48    0.33    0.47    1.41
10.13   1.89
 Exhst  HC:  0.80    1.00    1.12    1.04    1.26    0.33    0.47    1.41
 1.95   0.85
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62  0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
       0.19
 Runing HC:  0.18    0.17    0.22    0.19    0.43
       0.18
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56  0.09
 Exhst  CO: 11.82   14.07   15.21   14.46   40.92    0.76    0.87    6.00
11.13  12.38
 Exhst NOX:  1.70    2.04    2.16    2.08    6.90    1.56    1.80   18.86
 1.05   2.30

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
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AP C-2-8-8

```
R2                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 48.0   48.0   48.0          48.0   48.0   48.0   48.0
 48.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.79   2.03   2.26   2.11   4.45   0.33   0.46   1.39
10.12   1.86
 Exhst  HC:  0.79   0.99   1.11   1.03   1.24   0.33   0.46   1.39
1.94   0.84
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.17   0.17   0.22   0.18   0.42
        0.17
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.35  41.19   0.76   0.87   5.99
10.97  12.27
 Exhst NOX:  1.70   2.04   2.17   2.09   6.95   1.59   1.84  19.23
 1.06   2.32

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 49.0   49.0   49.0          49.0   49.0   49.0   49.0
 49.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.78   2.02   2.25   2.10   4.41   0.32   0.46   1.38
10.12   1.86
```

R-2

```
10.12    1.86
 Exhst   HC:  0.79    0.99    1.11    1.03    1.22    0.32    0.46    1.38
1.94     0.84
 Evap.   HC:  0.55    0.56    0.62    0.58    2.30
 7.62    0.58
 Refuel HC:   0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:   0.17    0.16    0.21    0.18    0.40
         0.17
 Rsting HC:   0.09    0.08    0.07    0.08    0.09
 0.56    0.09
 Exhst   CO: 11.69   13.97   15.07   14.35   41.55    0.76    0.87    6.00
10.97    12.28
 Exhst  NOX:  1.78    2.13    2.26    2.18    7.00    1.63    1.88   19.64
 1.09    2.40

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0Emission factors are as of July 1st of the indicated calendar
year. R2
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low             Altitude:   500.
Ft.
                          I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 50.0    50.0    50.0           50.0    50.0    50.0    50.0
 50.0
   VMT Mix:  0.830   0.071   0.037          0.020   0.012   0.001   0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  1.78    2.02    2.24    2.10    4.38    0.32    0.45    1.36
10.12    1.85
 Exhst   HC:  0.79    0.99    1.11    1.03    1.20    0.32    0.45    1.36
 1.94    0.84
 Evap.   HC:  0.55    0.56    0.62    0.58    2.30
 7.62    0.58
 Refuel HC:   0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:   0.16    0.15    0.20    0.17    0.38
         0.16
 Rsting HC:   0.09    0.08    0.07    0.08    0.09
 0.56    0.09
 Exhst   CO: 11.69   13.97   15.07   14.35   42.00    0.77    0.87    6.01
10.97    12.29
 Exhst  NOX:  1.85    2.21    2.36    2.26    7.05    1.66    1.92   20.08
 1.13    2.49
```

AP C-2-8-10

R-2

```
 Veh. Spd.: 52.0    52.0    52.0            52.0    52.0    52.0    52.0
 52.0
   VMT Mix:  0.830  0.071  0.037           0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.76    2.01    2.23    2.08    4.32    0.31    0.44    1.33
10.12   1.84
 Exhst  HC:  0.79    0.99    1.11    1.03    1.17    0.31    0.44    1.33
1.94    0.83
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.15    0.14    0.19    0.16    0.36
        0.15
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 11.69   13.97   15.07   14.35   43.21    0.77    0.88    6.07
10.97   12.31
 Exhst NOX:  2.00    2.38    2.55    2.44    7.15    1.75    2.02   21.09
 1.19   2.66

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0Emission factors are as of July 1st of the indicated calendar
year.R2 ROAD
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 53.0    53.0    53.0            53.0    53.0    53.0    53.0
 53.0
   VMT Mix:  0.830  0.071  0.037           0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.76    2.00    2.22    2.08    4.29    0.31    0.44    1.32
10.12   1.83
 Exhst  HC:  0.79    0.99    1.11    1.03    1.16    0.31    0.44    1.32
1.94    0.83
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.58
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.14    0.14    0.18    0.15    0.34
        0.14
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
```

R-2

```
 0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.35  43.97   0.78   0.89   6.11
10.97  12.33
 Exhst NOX:  2.07   2.47   2.64   2.53   7.20   1.80   2.07  21.65
 1.23   2.75

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:  20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ ______
 Veh. Spd.: 54.0   54.0   54.0          54.0   54.0   54.0   54.0
 54.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.75   2.00   2.22   2.07   4.27   0.31   0.43   1.31
10.12   1.83
 Exhst  HC:  0.79   0.99   1.11   1.03   1.15   0.31   0.43   1.31
 1.94   0.83
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.14   0.13   0.17   0.15   0.33
        0.14
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.35  44.85   0.79   0.90   6.17
10.97  12.35
 Exhst NOX:  2.15   2.55   2.73   2.62   7.25   1.85   2.13  22.27
 1.26   2.84

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:  20.6
```

AP c.2-8-12

R-2

```
0User supplied veh registration distributions. R2 ROAD
0Cal. Year: 1990              Region: Low          Altitude:  500.
Ft.
                        I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 58.0   58.0   58.0          58.0   58.0   58.0   58.0
 58.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.89   2.18   2.43   2.27   4.21   0.30   0.42   1.28
10.54   1.96
 Exhst  HC:  0.94   1.19   1.34   1.24   1.13   0.30   0.42   1.28
2.36    0.98
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.58
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.12   0.12   0.15   0.13   0.29
        0.12
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 17.98  22.52  24.51  23.20  49.61   0.83   0.95   6.52
18.89  18.64
 Exhst NOX:  2.44   2.89   3.11   2.97   7.44   2.09   2.42  25.26
 1.40   3.21

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low          Altitude:  500.
Ft.
                        I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 59.0   59.0   59.0          59.0   59.0   59.0   59.0
 59.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
```

Ap C-2-8-13

```
   R3 MINOR ARTERY INPUTS FOR MOBILE5a 1990  10/4/93
1           PROMPT - vertical flag input, no prompting
            MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1           TAMFLG - default tampering rates

1           SPDFLG - one speed per scenario
3           VMFLAG -           vehicle mix-state

3          MYMRFG - local registration and default mileage accrual
rates
1           NEWFLG - default exhaust emission rates

2           IMFLAG - include I/M program

1           ALHFLG - no additional correction factor inputs

1           ATPFLG - no anti-tampering program

1            RLFLAG - Stage II vapor recovery program not in Base
Year
2          LOCFLG - read in local area parameters one time for all
scenarios
1           TEMFLG - use max/min temps
4           OUTFMT - 80 column descriptive format

4                    PRTFLG   -   print   VOC,   CO,   and   NOx   values
[1-VOC,2-CO,3-NOx,4-all]
2           IDLFLG - print idle emissions results

3             NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4           HCFLAG - tot & comps HC

.836.074.038.012.012.001.021.006
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
```

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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1       .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000
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AT c.2-9-3

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   R3 MINOR ARTERY MOBILE5a OUTPUT 10/7/93
1            MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):             1983
     Pre-1981 MYR stringency rate:        12%
     First model year covered:           1976
     Last model year covered:            2020
     Waiver rate (pre-1981):              1.%
     Waiver rate (1981 and newer):        1.%
     Compliance Rate:                    80.%
     Inspection type:                       Computerized Test and
Repair
     Inspection frequency                Annual
     Vehicle types covered:              LDGV - Yes
                                        LDGT1 - Yes
                                        LDGT2 - Yes
                                         HDGV - No
     1981 & later MYR test type:         Idle
     Cutpoints, HC:  220.000   CO:     1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 68. (F)   Maximum Temp: 94. (F)
                     Period 1 RVP: 11.5        Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_______________________________________________________________
________________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
  VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.81  42.13   1.46   2.05   6.19
26.55  22.24
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46   2.05   6.19
18.37  10.27
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.20   2.37   2.66   2.47   5.31   0.43   0.60   1.81
10.54   2.29
 Exhst  HC:  1.02   1.23   1.39   1.28   1.85   0.43   0.60   1.81
 2.36   1.08
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.35   0.27   0.34   0.29   0.66
        0.33
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 14.43  16.50  18.17  17.07  45.94   0.92   1.05   7.23
15.42  14.78
 Exhst NOX:  1.64   1.95   2.07   1.99   6.27   1.38   1.59  16.67
 0.96   2.04

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
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                  Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 38.0   38.0   38.0          38.0   38.0   38.0   38.0
 38.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.06   2.24   2.51   2.33   4.97   0.39   0.55   1.65
10.35   2.14
 Exhst  HC:  0.94   1.13   1.28   1.18   1.60   0.39   0.55   1.65
 2.17   0.99
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.29   0.23   0.30   0.25   0.58
        0.28
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 13.38  15.43  16.94  15.95  42.61   0.84   0.96   6.61
13.56  13.72
 Exhst NOX:  1.66   1.98   2.10   2.02   6.46   1.40   1.62  16.88
 0.99   2.07

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                        I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 39.0   39.0   39.0          39.0   39.0   39.0   39.0
 39.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.02   2.22   2.48   2.31   4.90   0.38   0.54   1.62
10.31   2.11
 Exhst  HC:  0.92   1.11   1.26   1.16   1.54   0.38   0.54   1.62
 2.14   0.97
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 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.28   0.23   0.29   0.25   0.56
         0.27
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 13.16  15.22  16.69  15.72  42.05   0.83   0.94   6.49
13.18  13.49
 Exhst NOX:  1.66   1.99   2.11   2.03   6.51   1.41   1.63  16.99
 1.00   2.08

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.99   2.19   2.45   2.28   4.83   0.37   0.53   1.59
10.28   2.08
 Exhst  HC:  0.90   1.10   1.24   1.14   1.50   0.37   0.53   1.59
 2.10   0.95
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.27   0.22   0.28   0.24   0.54
         0.26
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 12.95  15.02  16.45  15.51  41.58   0.81   0.93   6.39
12.83  13.29
 Exhst NOX:  1.67   2.00   2.12   2.04   6.56   1.42   1.64  17.13
 1.01   2.08

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0Emission factors are as of July 1st of the indicated calendar
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year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 41.0   41.0   41.0           41.0   41.0   41.0   41.0
 41.0
   VMT Mix:  0.836  0.074  0.038          0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.96   2.17   2.42   2.25   4.77   0.37   0.52   1.56
10.25   2.05
 Exhst  HC:  0.88   1.08   1.22   1.13   1.45   0.37   0.52   1.56
2.07   0.93
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.26   0.21   0.27   0.23   0.53
        0.25
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 12.76  14.84  16.23  15.31  41.21   0.80   0.91   6.30
12.51  13.09
 Exhst NOX:  1.67   2.00   2.13   2.04   6.61   1.43   1.65  17.29
 1.01   2.09

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 42.0   42.0   42.0           42.0   42.0   42.0   42.0
 42.0
   VMT Mix:  0.836  0.074  0.038          0.012  0.012  0.001  0.021
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0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.94    2.14    2.40    2.23    4.72    0.36    0.51    1.53
10.22   2.02
 Exhst  HC:  0.87    1.06    1.20    1.11    1.41    0.36    0.51    1.53
2.04    0.92
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.24    0.20    0.26    0.22    0.51
        0.24
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 12.58   14.68   16.02   15.14   40.94    0.79    0.90    6.22
12.23   12.92
 Exhst NOX:  1.67    2.01    2.13    2.05    6.66    1.45    1.67   17.48
 1.02   2.10

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes          Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+          ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 43.0    43.0    43.0            43.0    43.0    43.0    43.0
 43.0
   VMT Mix:  0.836   0.074   0.038           0.012   0.012   0.001   0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.91    2.12    2.37    2.21    4.66    0.35    0.50    1.50
10.20   2.00
 Exhst  HC:  0.85    1.05    1.18    1.09    1.38    0.35    0.50    1.50
2.02    0.90
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.23    0.20    0.25    0.22    0.49
        0.22
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 12.41   14.53   15.84   14.97   40.76    0.78    0.89    6.15
11.96   12.75
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year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______  ______
 Veh. Spd.: 41.0   41.0   41.0          41.0   41.0   41.0   41.0
 41.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.96   2.17   2.42   2.25   4.77   0.37   0.52   1.56
10.25   2.05
 Exhst  HC:  0.88   1.08   1.22   1.13   1.45   0.37   0.52   1.56
2.07   0.93
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.26   0.21   0.27   0.23   0.53
        0.25
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 12.76  14.84  16.23  15.31  41.21   0.80   0.91   6.30
12.51  13.09
 Exhst NOX:  1.67   2.00   2.13   2.04   6.61   1.43   1.65  17.29
 1.01   2.09

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______  ______
 Veh. Spd.: 42.0   42.0   42.0          42.0   42.0   42.0   42.0
 42.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
```

```
0.006
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  1.94    2.14    2.40    2.23    4.72    0.36    0.51    1.53
10.22   2.02
 Exhst   HC:  0.87    1.06    1.20    1.11    1.41    0.36    0.51    1.53
2.04    0.92
 Evap.   HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:   0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:   0.24    0.20    0.26    0.22    0.51
        0.24
 Rsting HC:   0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst   CO: 12.58   14.68   16.02   15.14   40.94    0.79    0.90    6.22
12.23   12.92
 Exhst NOX:   1.67    2.01    2.13    2.05    6.66    1.45    1.67   17.48
 1.02   2.10

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes         Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+          ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 43.0    43.0    43.0            43.0    43.0    43.0    43.0
 43.0
   VMT Mix:  0.836   0.074   0.038           0.012   0.012   0.001   0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  1.91    2.12    2.37    2.21    4.66    0.35    0.50    1.50
10.20   2.00
 Exhst   HC:  0.85    1.05    1.18    1.09    1.38    0.35    0.50    1.50
2.02    0.90
 Evap.   HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.59
 Refuel HC:   0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:   0.23    0.20    0.25    0.22    0.49
        0.22
 Rsting HC:   0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst   CO: 12.41   14.53   15.84   14.97   40.76    0.78    0.89    6.15
11.96   12.75
```

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9

```
 Exhst NOX:  1.68   2.01   2.14   2.06   6.71   1.47   1.69  17.70
 1.02   2.11

________________________________________________________________________

_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes          Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88   2.10   2.35   2.18   4.61   0.35   0.49   1.48
10.18   1.97
 Exhst  HC:  0.84   1.04   1.16   1.08   1.34   0.35   0.49   1.48
 2.00   0.89
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.22   0.19   0.25   0.21   0.48
        0.21
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56  0.09
 Exhst  CO: 12.25  14.40  15.66  14.83  40.66   0.78   0.89   6.10
11.73  12.60
 Exhst NOX:  1.68   2.02   2.14   2.06   6.76   1.49   1.72  17.95
 1.03   2.12

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_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes          Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

AP c-2-9-10   10

```
 Exhst NOX:  1.68    2.01    2.14    2.06    6.71    1.47    1.69   17.70
 1.02   2.11

________________________________________________________________________________

_________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low               Altitude:  500.
Ft.
                       I/M Program: Yes         Ambient Temp:    87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No        Operating Mode:    20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
_____  _____
 Veh. Spd.: 44.0   44.0   44.0            44.0    44.0    44.0    44.0
 44.0
   VMT Mix:  0.836  0.074  0.038          0.012   0.012   0.001   0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88    2.10    2.35    2.18    4.61    0.35    0.49    1.48
10.18   1.97
 Exhst  HC:  0.84    1.04    1.16    1.08    1.34    0.35    0.49    1.48
 2.00   0.89
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.22    0.19    0.25    0.21    0.48
        0.21
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 12.25   14.40   15.66   14.83   40.66    0.78    0.89    6.10
11.73   12.60
 Exhst NOX:  1.68    2.02    2.14    2.06    6.76    1.49    1.72   17.95
 1.03   2.12

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_________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low               Altitude:  500.
Ft.
                       I/M Program: Yes         Ambient Temp:    87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No        Operating Mode:    20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
```

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```
  Exhst  HC:  0.79    0.99    1.11    1.03    1.22    0.32    0.46    1.38
 1.94   0.84
  Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.59
  Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
  Runing HC:  0.17    0.16    0.21    0.18    0.40
         0.16
  Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
  Exhst  CO: 11.69   13.97   15.07   14.34   41.55    0.76    0.87    6.00
10.97  12.08
  Exhst NOX:  1.78    2.13    2.26    2.17    7.00    1.63    1.88   19.64
 1.09   2.25
```

```
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low              Altitude:  500.
Ft.
                        I/M Program: Yes          Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 50.0   50.0   50.0           50.0   50.0   50.0   50.0
 50.0
   VMT Mix:  0.836  0.074  0.038          0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.78    2.02    2.24    2.10    4.38    0.32    0.45    1.36
10.12   1.87
 Exhst  HC:  0.79    0.99    1.11    1.03    1.20    0.32    0.45    1.36
 1.94   0.84
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62  0.59
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.16    0.15    0.20    0.17    0.38
        0.16
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56  0.09
 Exhst  CO: 11.69   13.97   15.07   14.34   42.00    0.77    0.87    6.01
10.97  12.09
 Exhst NOX:  1.85    2.21    2.36    2.26    7.05    1.66    1.92   20.08
 1.13   2.34
```

A7 C-2-9-12

```
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                     I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC    All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 51.0   51.0   51.0          51.0   51.0   51.0   51.0
 51.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.77   2.01   2.24   2.09   4.35   0.32   0.45   1.35
10.12   1.86
 Exhst  HC:  0.79   0.99   1.11   1.03   1.18   0.32   0.45   1.35
 1.94   0.83
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.16   0.15   0.19   0.16   0.37
        0.15
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.34  42.55   0.77   0.88   6.03
10.97  12.09
 Exhst NOX:  1.93   2.30   2.45   2.35   7.10   1.70   1.97  20.56
 1.16   2.42

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                     I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC    All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 52.0   52.0   52.0          52.0   52.0   52.0   52.0
```

AP c-2-9-13

```
 52.0
   VMT Mix:  0.836  0.074  0.038          0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.76   2.01   2.23   2.08   4.32   0.31   0.44   1.33
10.12   1.85
 Exhst  HC:  0.79   0.99   1.11   1.03   1.17   0.31   0.44   1.33
1.94    0.83
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.15   0.14   0.19   0.16   0.36
        0.15
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.34  43.21   0.77   0.88   6.07
10.97  12.10
 Exhst NOX:  2.00   2.38   2.55   2.44   7.15   1.75   2.02  21.09
 1.19   2.50


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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 53.0   53.0   53.0          53.0   53.0   53.0   53.0
 53.0
   VMT Mix:  0.836  0.074  0.038          0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.76   2.00   2.22   2.08   4.29   0.31   0.44   1.32
10.12   1.85
 Exhst  HC:  0.79   0.99   1.11   1.03   1.16   0.31   0.44   1.32
1.94    0.83
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.14   0.14   0.18   0.15   0.34
        0.14
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.34  43.97   0.78   0.89   6.11
10.97  12.11
 Exhst NOX:  2.07   2.47   2.64   2.53   7.20   1.80   2.07  21.65
 1.23   2.59

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+
           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 54.0   54.0   54.0          54.0   54.0   54.0   54.0
 54.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.75   2.00   2.22   2.07   4.27   0.31   0.43   1.31
10.12   1.84
 Exhst  HC:  0.79   0.99   1.11   1.03   1.15   0.31   0.43   1.31
 1.94   0.83
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.59
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.14   0.13   0.17   0.15   0.33
        0.14
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 11.69  13.97  15.07  14.34  44.85   0.79   0.90   6.17
10.97  12.12
 Exhst NOX:  2.15   2.55   2.73   2.61   7.25   1.85   2.13  22.27
 1.26   2.68

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
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     R4 MAJOR COLLECTOR MOBILE5.a INPUTS 10/4/93
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1          TAMFLG - default tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG -         vehicle mix-State

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.744.127.065.020.010.002.027.005
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                         - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                         - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                         - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                         - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                         - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1      .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
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HP c-2-10-2

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1 90 44.0 85.4 20.6 27.3 20.6 7
1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
00000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000
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```
   R4 MAJOR COLLECTOR MOBILE5a OUTPUT 10/4/93
1           MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0     Start year (January 1):                 1983
      Pre-1981 MYR stringency rate:            12%
      First model year covered:               1976
      Last model year covered:                2020
      Waiver rate (pre-1981):                  1.%
      Waiver rate (1981 and newer):            1.%
      Compliance Rate:                        80.%
      Inspection type:                           Computerized Test and
Repair
      Inspection frequency                    Annual
      Vehicle types covered:                  LDGV - Yes
                                             LDGT1 - Yes
                                             LDGT2 - Yes
                                              HDGV - No
      1981 & later MYR test type:             Idle
      Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                         Minimum Temp: 68. (F)   Maximum Temp: 94. (F)
                         Period 1 RVP: 11.5        Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5            2.5     2.5     2.5     2.5
  2.5
   VMT Mix:  0.744  0.127  0.065          0.020   0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.80  42.13   1.46    2.05    6.19
26.55  22.34
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46    2.05    6.19
18.37  10.38
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.60
```

AP C.2-10.4

```
 VOC    HC:  2.28   2.45   2.75   2.55   5.52   0.45   0.63   1.91
10.66   2.41
 Exhst  HC:  1.08   1.29   1.46   1.34   2.02   0.45   0.63   1.91
2.48    1.17
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.60
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.38   0.29   0.36   0.31   0.71
        0.36
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 15.06  17.17  18.91  17.76  48.33   0.97   1.11   7.65
16.56  15.88
 Exhst NOX:  1.63   1.93   2.05   1.98   6.17   1.38   1.60  16.71
 0.94   2.19

-----------------------------------------------------------------------

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
               Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC    All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 33.0   33.0   33.0          33.0   33.0   33.0   33.0
 33.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.24   2.41   2.71   2.51   5.41   0.44   0.62   1.86
10.60   2.36
 Exhst  HC:  1.05   1.26   1.42   1.31   1.93   0.44   0.62   1.86
2.42    1.14
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.60
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.36   0.28   0.35   0.30   0.69
        0.34
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 14.73  16.83  18.53  17.40  47.07   0.95   1.08   7.43
15.97  15.54
 Exhst NOX:  1.63   1.94   2.06   1.98   6.22   1.38   1.60  16.68
 0.95   2.19
```

AP C-2-10-5

```
 Veh. Spd.: 35.0    35.0    35.0            35.0    35.0    35.0    35.0
 35.0
   VMT Mix:  0.744   0.127   0.065           0.020   0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.16    2.34    2.62    2.43    5.22    0.42    0.59    1.77
10.49   2.28
 Exhst  HC:  1.00    1.20    1.36    1.26    1.78    0.42    0.59    1.77
2.31    1.09
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.60
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.34    0.26    0.33    0.28    0.64
         0.32
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 14.14   16.20   17.83   16.75   44.93    0.90    1.02    7.05
14.90   14.91
 Exhst NOX:  1.64    1.96    2.08    2.00    6.31    1.38    1.60   16.69
 0.97    2.21

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low              Altitude:  500.
Ft.
                         I/M Program: Yes       Ambient Temp:    87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 36.0    36.0    36.0            36.0    36.0    36.0    36.0
 36.0
   VMT Mix:  0.744   0.127   0.065           0.020   0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.12    2.30    2.58    2.40    5.13    0.41    0.57    1.73
10.44   2.25
 Exhst  HC:  0.98    1.18    1.33    1.23    1.71    0.41    0.57    1.73
 2.26   1.06
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.60
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.32    0.25    0.32    0.27    0.62
         0.30
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 13.87  15.93  17.51  16.46  44.05   0.88   1.00   6.89
14.42  14.63
 Exhst NOX:  1.65   1.97   2.09   2.01   6.36   1.39   1.60  16.73
 0.98   2.21

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                        I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+
          ______ ______ ______ ______ ______ ______ ______ ______

______ ______
 Veh. Spd.: 37.0   37.0   37.0          37.0   37.0   37.0   37.0
 37.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09   2.27   2.55   2.37   5.05   0.40   0.56   1.69
10.39   2.21
 Exhst  HC:  0.96   1.16   1.31   1.21   1.65   0.40   0.56   1.69
 2.22   1.04
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.60
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.31   0.24   0.31   0.26   0.60
        0.29
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 13.62  15.67  17.22  16.19  43.28   0.86   0.98   6.74
13.97  14.37
 Exhst NOX:  1.65   1.98   2.10   2.02   6.41   1.39   1.61  16.79
 0.99   2.22

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                        I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
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AP C-2-10-7

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                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+          _______ _______ _______ _______ _______ _______ _______ _______
______ ______
 Veh. Spd.: 38.0    38.0   38.0            38.0    38.0    38.0    38.0
 38.0
   VMT Mix:  0.744  0.127  0.065          0.020   0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.06    2.24   2.51    2.33    4.97    0.39    0.55    1.65
10.35   2.18
 Exhst  HC:  0.94    1.13   1.28    1.18    1.60    0.39    0.55    1.65
 2.17   1.02
 Evap.  HC:  0.55    0.56   0.62    0.58    2.30
  7.62   0.60
 Refuel HC:  0.19    0.24   0.24    0.24    0.41
        0.19
 Runing HC:  0.29    0.23   0.30    0.25    0.58
        0.28
 Rsting HC:  0.09    0.08   0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 13.38   15.43  16.94   15.95   42.61    0.84    0.96    6.61
 13.56  14.13
 Exhst NOX:  1.66    1.98   2.10    2.02    6.46    1.40    1.62   16.88
 0.99   2.23

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+          _______ _______ _______ _______ _______ _______ _______ _______
______ ______
 Veh. Spd.: 39.0    39.0   39.0            39.0    39.0    39.0    39.0
 39.0
   VMT Mix:  0.744  0.127  0.065          0.020   0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.02    2.22   2.48    2.31    4.90    0.38    0.54    1.62
10.31   2.15
 Exhst  HC:  0.92    1.11   1.26    1.16    1.54    0.38    0.54    1.62
 2.14   1.00
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AP c. 2-10-8

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 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.60
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.28   0.23   0.29   0.25   0.56
         0.27
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 13.16  15.22  16.69  15.72  42.05   0.83   0.94   6.49
13.18  13.90
 Exhst NOX:  1.66   1.99   2.11   2.03   6.51   1.41   1.63  16.99
 1.00   2.24

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes      Ambient Temp:  87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No     Operating Mode:  20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.99   2.19   2.45   2.28   4.83   0.37   0.53   1.59
10.28   2.12
 Exhst  HC:  0.90   1.10   1.24   1.14   1.50   0.37   0.53   1.59
 2.10   0.98
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.60
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
         0.19
 Runing HC:  0.27   0.22   0.28   0.24   0.54
         0.26
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.09
 Exhst  CO: 12.95  15.02  16.45  15.50  41.58   0.81   0.93   6.39
12.83  13.69
 Exhst NOX:  1.67   2.00   2.12   2.04   6.56   1.42   1.64  17.13
 1.01   2.25

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0Emission factors are as of July 1st of the indicated calendar
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0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.94    2.14    2.40    2.23    4.72    0.36    0.51    1.53
10.22   2.06
 Exhst  HC:  0.87    1.06    1.20    1.11    1.41    0.36    0.51    1.53
 2.04   0.94
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.60
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.24    0.20    0.26    0.22    0.51
        0.23
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 12.58   14.68   16.02   15.13   40.94    0.79    0.90    6.22
12.23  13.32
 Exhst NOX:  1.67    2.01    2.13    2.05    6.66    1.45    1.67   17.48
 1.02   2.27

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low             Altitude:  500.
Ft.
                        I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV   LDGT1  LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 43.0    43.0   43.0            43.0    43.0    43.0    43.0
 43.0
   VMT Mix:  0.744   0.127  0.065           0.020   0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.91    2.12    2.37    2.21    4.66    0.35    0.50    1.50
10.20   2.03
 Exhst  HC:  0.85    1.05    1.18    1.09    1.38    0.35    0.50    1.50
 2.02   0.93
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.60
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.23    0.20    0.25    0.22    0.49
        0.22
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.09
 Exhst  CO: 12.41   14.53   15.84   14.97   40.76    0.78    0.89    6.15
11.96  13.16
```

AP C.2-10-10

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 Exhst NOX:  1.68   2.01   2.14   2.06   6.71   1.47   1.69  17.70
 1.02   2.28

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88   2.10   2.35   2.18   4.61   0.35   0.49   1.48
10.18   2.01
 Exhst  HC:  0.84   1.04   1.16   1.08   1.34   0.35   0.49   1.48
 2.00   0.91
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.60
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.22   0.19   0.25   0.21   0.48
        0.21
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.09
 Exhst  CO: 12.25  14.40  15.66  14.83  40.66   0.78   0.89   6.10
11.73  13.00
 Exhst NOX:  1.68   2.02   2.14   2.06   6.76   1.49   1.72  17.95
 1.03   2.29

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

```
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 48.0   48.0   48.0           48.0    48.0    48.0    48.0
 48.0
   VMT Mix:  0.744  0.127  0.065          0.020  0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.79    2.03    2.26    2.11    4.45    0.33    0.46    1.39
10.12   1.92
 Exhst  HC:  0.79    0.99    1.11    1.03    1.24    0.33    0.46    1.39
 1.94   0.86
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.60
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.17    0.17    0.22    0.18    0.42
        0.17
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.09
 Exhst  CO: 11.69   13.97   15.07   14.34   41.19    0.76    0.87    5.99
10.97  12.50
 Exhst NOX:  1.70    2.04    2.17    2.09    6.95    1.59    1.84   19.23
 1.06   2.35

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_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 49.0   49.0   49.0           49.0    49.0    49.0    49.0
 49.0
   VMT Mix:  0.744  0.127  0.065          0.020  0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.78    2.02    2.25    2.10    4.41    0.32    0.46    1.38
10.12   1.91
```

AP C 2-10-12

```
    R5 MINOR COLLECTOR MOBILE5a INPUTS 10/4/93
1           PROMPT - vertical flag input, no prompting
            MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1           TAMFLG - default tampering rates

1           SPDFLG - one speed per scenario
3           VMFLAG -                vehicle mix-state

3          MYMRFG - local registration and default mileage accrual
rates
1           NEWFLG - default exhaust emission rates

2           IMFLAG - include I/M program

1           ALHFLG - no additional correction factor inputs

1           ATPFLG - no anti-tampering program

1            RLFLAG - Stage II vapor recovery program not in Base
Year
2          LOCFLG - read in local area parameters one time for all
scenarios
1           TEMFLG - use max/min temps
4           OUTFMT - 80 column descriptive format

4                PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2           IDLFLG - print idle emissions results

3             NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4           HCFLAG - tot & comps HC

.769.096.049.025.011.001.025.024
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
```

```
    R5 MINOR COLLECTOR MOBILE5.a OUTPUT 10/4/93
1            MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                1983
     Pre-1981 MYR stringency rate:           12%
     First model year covered:              1976
     Last model year covered:               2020
     Waiver rate (pre-1981):                 1.%
     Waiver rate (1981 and newer):           1.%
     Compliance Rate:                       80.%
     Inspection type:                          Computerized Test and
Repair
     Inspection frequency                   Annual
     Vehicle types covered:                  LDGV - Yes
                                            LDGT1 - Yes
                                            LDGT2 - Yes
                                             HDGV - No
     1981 & later MYR test type:            Idle
     Cutpoints, HC:  220.000    CO:     1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 68. (F)   Maximum Temp: 94. (F)
                     Period 1 RVP: 11.5        Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
________________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix: 0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.80  42.13   1.46   2.05   6.19
26.55  22.53
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46   2.05   6.19
18.37  10.51
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.74
```

AT C-2-11-2

```
0Cal. Year: 1990             Region: Low             Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 31.0   31.0   31.0          31.0   31.0   31.0   31.0
 31.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.33   2.49   2.80   2.59   5.64   0.46   0.65   1.96
10.72   2.62
 Exhst  HC:  1.11   1.32   1.49   1.38   2.11   0.46   0.65   1.96
2.54    1.22
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.40   0.30   0.37   0.32   0.74
        0.37
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 15.41  17.54  19.32  18.14  49.74   1.00   1.14   7.88
17.19  16.34
 Exhst NOX:  1.62   1.92   2.04   1.97   6.12   1.39   1.60  16.76
 0.93   2.14

______________________________________________________________________
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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low             Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 32.0   32.0   32.0          32.0   32.0   32.0   32.0
 32.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
```

AP C-2-11-3

```
 VOC    HC:  2.28    2.45    2.75    2.55    5.52    0.45    0.63    1.91
10.66   2.57
 Exhst  HC:  1.08    1.29    1.46    1.34    2.02    0.45    0.63    1.91
2.48    1.19
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.38    0.29    0.36    0.31    0.71
        0.35
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.10
 Exhst  CO: 15.06   17.17   18.91   17.76   48.33    0.97    1.11    7.65
16.56  15.96
 Exhst NOX:  1.63    1.93    2.05    1.98    6.17    1.38    1.60   16.71
0.94    2.15

________________________________________________________________________

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 33.0    33.0    33.0            33.0    33.0    33.0    33.0
 33.0
   VMT Mix:  0.769  0.096  0.049           0.025   0.011   0.001   0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.24    2.41    2.71    2.51    5.41    0.44    0.62    1.86
10.60   2.53
 Exhst  HC:  1.05    1.26    1.42    1.31    1.93    0.44    0.62    1.86
2.42    1.16
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.36    0.28    0.35    0.30    0.69
        0.34
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.10
 Exhst  CO: 14.73   16.83   18.53   17.40   47.07    0.95    1.08    7.43
15.97  15.61
 Exhst NOX:  1.63    1.94    2.06    1.98    6.22    1.38    1.60   16.68
 0.95   2.16
```

```
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______

 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.20   2.37   2.66   2.47   5.31   0.43   0.60   1.81
10.54   2.49
 Exhst  HC:  1.02   1.23   1.39   1.28   1.85   0.43   0.60   1.81
 2.36   1.13
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.35   0.27   0.34   0.29   0.66
        0.33
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
  0.56   0.10
 Exhst  CO: 14.43  16.50  18.17  17.07  45.94   0.92   1.05   7.23
15.42  15.28
 Exhst NOX:  1.64   1.95   2.07   1.99   6.27   1.38   1.59  16.67
 0.96   2.16

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
```

AP C.2-11-5

```
 Veh. Spd.: 35.0   35.0   35.0          35.0   35.0   35.0   35.0
 35.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.16   2.34   2.62   2.43   5.22   0.42   0.59   1.77
10.49   2.45
 Exhst  HC:  1.00   1.20   1.36   1.26   1.78   0.42   0.59   1.77
2.31   1.10
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.34   0.26   0.33   0.28   0.64
        0.31
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 14.14  16.20  17.83  16.75  44.93   0.90   1.02   7.05
14.90  14.97
 Exhst NOX:  1.64   1.96   2.08   2.00   6.31   1.38   1.60  16.69
 0.97   2.17
-------------------------------------------------------------------

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                     I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______

 Veh. Spd.: 36.0   36.0   36.0          36.0   36.0   36.0   36.0
 36.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.12   2.30   2.58   2.40   5.13   0.41   0.57   1.73
10.44   2.41
 Exhst  HC:  0.98   1.18   1.33   1.23   1.71   0.41   0.57   1.73
 2.26   1.08
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.32   0.25   0.32   0.27   0.62
        0.30
```

AT C.2-11-6

```
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.10
 Exhst  CO: 13.87   15.93   17.51   16.46   44.05    0.88    1.00    6.89
14.42  14.68
 Exhst NOX:  1.65    1.97    2.09    2.01    6.36    1.39    1.60   16.73
 0.98   2.18

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low             Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 37.0   37.0   37.0           37.0   37.0   37.0   37.0
 37.0
   VMT Mix:  0.769  0.096  0.049          0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09    2.27    2.55    2.37    5.05    0.40    0.56    1.69
10.39   2.37
 Exhst  HC:  0.96    1.16    1.31    1.21    1.65    0.40    0.56    1.69
 2.22   1.05
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.31    0.24    0.31    0.26    0.60
        0.29
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.10
 Exhst  CO: 13.62   15.67   17.22   16.19   43.28    0.86    0.98    6.74
13.97  14.42
 Exhst NOX:  1.65    1.98    2.10    2.02    6.41    1.39    1.61   16.79
 0.99   2.18

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_______________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low             Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
```

AF c.2-11-7

```
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 38.0   38.0   38.0          38.0   38.0   38.0   38.0
 38.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.06   2.24   2.51   2.33   4.97   0.39   0.55   1.65
10.35   2.34
 Exhst  HC:  0.94   1.13   1.28   1.18   1.60   0.39   0.55   1.65
 2.17   1.03
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.29   0.23   0.30   0.25   0.58
        0.28
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 13.38  15.43  16.94  15.94  42.61   0.84   0.96   6.61
13.56  14.17
 Exhst NOX:  1.66   1.98   2.10   2.02   6.46   1.40   1.62  16.88
 0.99   2.19

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low         Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 39.0   39.0   39.0          39.0   39.0   39.0   39.0
 39.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.02   2.22   2.48   2.31   4.90   0.38   0.54   1.62
10.31   2.31
 Exhst  HC:  0.92   1.11   1.26   1.16   1.54   0.38   0.54   1.62
 2.14   1.01
```

Af c.2-11-8

```
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.28    0.23    0.29    0.25    0.56
         0.27
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.10
 Exhst  CO: 13.16   15.22   16.69   15.71   42.05    0.83    0.94    6.49
13.18   13.94
 Exhst NOX:  1.66    1.99    2.11    2.03    6.51    1.41    1.63   16.99
 1.00    2.20

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
______  ______
 Veh. Spd.: 40.0    40.0    40.0            40.0    40.0    40.0    40.0
 40.0
   VMT Mix:  0.769  0.096  0.049            0.025   0.011   0.001   0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.99    2.19    2.45    2.28    4.83    0.37    0.53    1.59
10.28    2.28
 Exhst  HC:  0.90    1.10    1.24    1.14    1.50    0.37    0.53    1.59
 2.10    0.99
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
         0.19
 Runing HC:  0.27    0.22    0.28    0.24    0.54
         0.25
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.10
 Exhst  CO: 12.95   15.02   16.45   15.50   41.58    0.81    0.93    6.39
12.83   13.73
 Exhst NOX:  1.67    2.00    2.12    2.04    6.56    1.42    1.64   17.13
 1.01    2.21

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0Emission factors are as of July 1st of the indicated calendar
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              R-6 LOCAL
1             PROMPT - vertical flag input, no prompting
              MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dist. 1990)
1             TAMFLG - default tampering rates

1             SPDFLG - one speed per scenario
3             VMFLAG -               vehicle mix-state

3            MYMRFG - local registration and default mileage accrual
rates
1             NEWFLG - default exhaust emission rates

2             IMFLAG - include I/M program

1             ALHFLG - no additional correction factor inputs

1             ATPFLG - no anti-tampering program

1              RLFLAG - Stage II vapor recovery program not in Base
Year
2            LOCFLG - read in local area parameters one time for all
scenarios
1             TEMFLG - use max/min temps
4             OUTFMT - 80 column descriptive format

4                       PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2             IDLFLG - print idle emissions results

3               NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4             HCFLAG - tot & comps HC

.769.096.049.025.011.001.025.024
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
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.003 .002 .002 .001 .007                                  - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                                    21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                                  - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                        .I/M data
MA Base 90 w/Reg  0006800094011.5008.5 89 1 1             .LAP record
1 90 02.5 85.4 20.6 27.3 20.6 7
1 90 03.0 85.4 20.6 27.3 20.6 7
1 90 04.0 85.4 20.6 27.3 20.6 7
1 90 05.0 85.4 20.6 27.3 20.6 7
1 90 06.0 85.4 20.6 27.3 20.6 7
1 90 07.0 85.4 20.6 27.3 20.6 7
1 90 08.0 85.4 20.6 27.3 20.6 7
1 90 09.0 85.4 20.6 27.3 20.6 7
1 90 10.0 85.4 20.6 27.3 20.6 7
1 90 11.0 85.4 20.6 27.3 20.6 7
1 90 12.0 85.4 20.6 27.3 20.6 7
1 90 13.0 85.4 20.6 27.3 20.6 7
1 90 14.0 85.4 20.6 27.3 20.6 7
1 90 15.0 85.4 20.6 27.3 20.6 7
1 90 16.0 85.4 20.6 27.3 20.6 7
1 90 17.0 85.4 20.6 27.3 20.6 7
1 90 18.0 85.4 20.6 27.3 20.6 7
1 90 19.0 85.4 20.6 27.3 20.6 7
1 90 20.0 85.4 20.6 27.3 20.6 7
1 90 21.0 85.4 20.6 27.3 20.6 7
1 90 22.0 85.4 20.6 27.3 20.6 7
1 90 23.0 85.4 20.6 27.3 20.6 7
1 90 24.0 85.4 20.6 27.3 20.6 7
1 90 25.0 85.4 20.6 27.3 20.6 7
1 90 26.0 85.4 20.6 27.3 20.6 7
1 90 27.0 85.4 20.6 27.3 20.6 7
1 90 28.0 85.4 20.6 27.3 20.6 7
1 90 29.0 85.4 20.6 27.3 20.6 7
1 90 30.0 85.4 20.6 27.3 20.6 7
1 90 31.0 85.4 20.6 27.3 20.6 7
1 90 32.0 85.4 20.6 27.3 20.6 7
1 90 33.0 85.4 20.6 27.3 20.6 7
1 90 34.0 85.4 20.6 27.3 20.6 7
1 90 35.0 85.4 20.6 27.3 20.6 7
1 90 36.0 85.4 20.6 27.3 20.6 7
1 90 37.0 85.4 20.6 27.3 20.6 7
1 90 38.0 85.4 20.6 27.3 20.6 7
1 90 39.0 85.4 20.6 27.3 20.6 7
1 90 40.0 85.4 20.6 27.3 20.6 7
1 90 41.0 85.4 20.6 27.3 20.6 7
1 90 42.0 85.4 20.6 27.3 20.6 7
1 90 43.0 85.4 20.6 27.3 20.6 7
1 90 44.0 85.4 20.6 27.3 20.6 7
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1 90 45.0 85.4 20.6 27.3 20.6 7
1 90 46.0 85.4 20.6 27.3 20.6 7
1 90 47.0 85.4 20.6 27.3 20.6 7
1 90 48.0 85.4 20.6 27.3 20.6 7
1 90 49.0 85.4 20.6 27.3 20.6 7
1 90 50.0 85.4 20.6 27.3 20.6 7
1 90 51.0 85.4 20.6 27.3 20.6 7
1 90 52.0 85.4 20.6 27.3 20.6 7
1 90 53.0 85.4 20.6 27.3 20.6 7
1 90 54.0 85.4 20.6 27.3 20.6 7
1 90 55.0 85.4 20.6 27.3 20.6 7
1 90 56.0 85.4 20.6 27.3 20.6 7
1 90 57.0 85.4 20.6 27.3 20.6 7
1 90 58.0 85.4 20.6 27.3 20.6 7
1 90 59.0 85.4 20.6 27.3 20.6 7
1 90 60.0 85.4 20.6 27.3 20.6 7
1 90 61.1 85.4 20.6 27.3 20.6 7
1 90 62.0 85.4 20.6 27.3 20.6 7
1 90 63.0 85.4 20.6 27.3 20.6 7
1 90 64.0 85.4 20.6 27.3 20.6 7
1 90 65.0 85.4 20.6 27.3 20.6 7
00000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000
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C-2-12-3

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1          MOBILE 5a VOCs 1990 Base Year Emissions Inv. 6/11/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                  1983
     Pre-1981 MYR stringency rate:             12%
     First model year covered:                1976
     Last model year covered:                 2020
     Waiver rate (pre-1981):                   1.%
     Waiver rate (1981 and newer):             1.%
     Compliance Rate:                         80.%
     Inspection type:                            Computerized Test and
Repair
     Inspection frequency                     Annual
     Vehicle types covered:                   LDGV - Yes
                                             LDGT1 - Yes
                                             LDGT2 - Yes
                                              HDGV - No
     1981 & later MYR test type:              Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                    Minimum Temp: 68. (F)   Maximum Temp: 94. (F)
                    Period 1 RVP: 11.5        Period 2 RVP:   8.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_______________________________________________________________
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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                     I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix: 0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 22.58  21.09  26.16  22.80  42.13   1.46   2.05   6.19
26.55  22.53
 Exhst  HC: 10.23  10.61  12.91  11.39  15.14   1.46   2.05   6.19
18.37  10.51
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.74
 Runing HC:  0.68   0.49   0.61   0.53   1.22
        0.63
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 22.24  24.34  27.25  25.32  83.33   1.67   1.91  13.13
28.83  23.90
 Exhst NOX:  1.55   1.75   1.87   1.79   5.53   1.61   1.86  19.47
 0.75   2.11

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 20.0   20.0   20.0          20.0   20.0   20.0   20.0
 20.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  3.04   3.17   3.61   3.32   7.78   0.66   0.93   2.81
11.67   3.37
 Exhst  HC:  1.60   1.85   2.10   1.93   3.85   0.66   0.93   2.81
 3.49   1.77
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.62   0.45   0.57   0.49   1.14
        0.57
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 21.33  23.53  26.26  24.45  78.86   1.59   1.81  12.46
27.41  22.91
 Exhst NOX:  1.55   1.76   1.88   1.80   5.58   1.58   1.83  19.08
 0.76   2.11

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
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 Exhst  HC:  1.48   1.72   1.95   1.80   3.40   0.61   0.87   2.61
3.27   1.63
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
       0.19
 Runing HC:  0.57   0.41   0.52   0.45   1.04
       0.53
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 19.85  22.10  24.53  22.93  71.10   1.44   1.64  11.28
24.92  21.26
 Exhst NOX:  1.57   1.80   1.92   1.84   5.68   1.53   1.76  18.40
0.79   2.11

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          _____  _____  _____  _____  _____  _____  _____  _____
_____ _____
 Veh. Spd.: 23.0   23.0   23.0          23.0   23.0   23.0   23.0
 23.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.79   2.93   3.32   3.06   6.99   0.59   0.84   2.52
11.35   3.11
 Exhst  HC:  1.42   1.66   1.89   1.74   3.20   0.59   0.84   2.52
 3.17   1.57
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
       0.19
 Runing HC:  0.54   0.40   0.50   0.43   1.00
       0.51
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 19.20  21.46  23.78  22.25  67.73   1.37   1.56  10.76
23.82  20.54
 Exhst NOX:  1.57   1.82   1.94   1.86   5.73   1.50   1.73  18.11
 0.81   2.11

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 24.0   24.0   24.0          24.0   24.0   24.0   24.0
 24.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.72   2.86   3.24   2.99   6.77   0.57   0.81   2.44
11.25   3.03
 Exhst  HC:  1.37   1.61   1.83   1.68   3.02   0.57   0.81   2.44
3.07   1.51
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.52   0.38   0.48   0.42   0.96
        0.49
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 18.60  20.86  23.08  21.61  64.67   1.31   1.49  10.28
22.80  19.87
 Exhst NOX:  1.58   1.83   1.95   1.87   5.77   1.48   1.71  17.85
 0.83   2.12

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 25.0   25.0   25.0          25.0   25.0   25.0   25.0
 25.0
   VMT Mix:  0.769  0.096  0.049          0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.65   2.80   3.17   2.92   6.57   0.55   0.78   2.36
11.16   2.96
 Exhst  HC:  1.32   1.56   1.77   1.63   2.85   0.55   0.78   2.36
2.98    1.46
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.50   0.37   0.46   0.40   0.92
        0.47
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 18.04  20.30  22.43  21.02  61.88   1.25   1.43   9.85
21.85  19.25
 Exhst NOX:  1.59   1.85   1.97   1.89   5.82   1.46   1.69  17.61
 0.84   2.12

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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                     I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 26.0   26.0   26.0          26.0   26.0   26.0   26.0
 26.0
   VMT Mix:  0.769  0.096  0.049          0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.59   2.74   3.10   2.86   6.38   0.54   0.76   2.28
11.08   2.89
 Exhst  HC:  1.28   1.51   1.72   1.58   2.70   0.54   0.76   2.28
2.90    1.42
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.48   0.35   0.44   0.38   0.89
        0.45
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 17.52   19.77   21.82   20.46   59.34    1.20    1.37    9.44
20.96   18.68
 Exhst NOX:   1.59    1.86    1.98    1.90    5.87    1.44    1.67  17.40
 0.86    2.12

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low              Altitude:  500.
Ft.
                          I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 27.0   27.0   27.0          27.0   27.0   27.0   27.0
 27.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.53    2.68    3.03    2.80    6.21    0.52    0.73    2.21
11.00   2.83
 Exhst  HC:  1.24    1.47    1.67    1.53    2.56    0.52    0.73    2.21
2.82    1.37
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.46    0.34    0.43    0.37    0.85
        0.43
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.10
 Exhst  CO: 17.04   19.27   21.26   19.94   57.03    1.16    1.32    9.08
20.11   18.15
 Exhst NOX:  1.60    1.88    2.00    1.92    5.92    1.43    1.65   17.23
 0.87    2.13

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0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low              Altitude:  500.
Ft.
                          I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
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                    Reformulated Gas: No
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT     HDGV     LDDV     LDDT     HDDV
 MC   All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 28.0   28.0    28.0              28.0     28.0     28.0     28.0
 28.0
   VMT Mix:  0.769  0.096   0.049             0.025    0.011    0.001    0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.47    2.63    2.97    2.74     6.05     0.50     0.71     2.14
10.93   2.77
 Exhst  HC:  1.20    1.43    1.62    1.49     2.43     0.50     0.71     2.14
2.75    1.33
 Evap.  HC:  0.55    0.56    0.62    0.58     2.30
  7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24     0.41
        0.19
 Runing HC:  0.45    0.33    0.41    0.36     0.82
        0.41
 Rsting HC:  0.09    0.08    0.07    0.08     0.09
  0.56   0.10
 Exhst  CO: 16.59   18.80   20.73   19.45    54.93     1.11     1.27     8.74
19.32  17.65
 Exhst NOX:  1.61    1.89    2.01    1.93     5.97     1.42     1.63    17.07
 0.89   2.13

_________________________________________________________________________________
_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low              Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT     HDGV     LDDV     LDDT     HDDV
 MC   All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 29.0   29.0    29.0              29.0     29.0     29.0     29.0
 29.0
   VMT Mix:  0.769  0.096   0.049             0.025    0.011    0.001    0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.42    2.58    2.91    2.69     5.90     0.49     0.69     2.08
10.85   2.72
 Exhst  HC:  1.17    1.39    1.57    1.45     2.32     0.49     0.69     2.08
2.67    1.29
 Evap.  HC:  0.55    0.56    0.62    0.58     2.30
  7.62   0.74
```

C-2-12-10

```
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.43    0.32    0.40    0.34    0.79
        0.40
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.10
 Exhst  CO: 16.17   18.35   20.23   18.99   53.03    1.07    1.22    8.43
18.57   17.18
 Exhst NOX:  1.61    1.90    2.02    1.94    6.02    1.40    1.62   16.94
 0.90    2.13

_____________________________________________________________________________
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0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low             Altitude:  500.
Ft.
                         I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                   Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 30.0    30.0    30.0            30.0    30.0    30.0    30.0
 30.0
   VMT Mix:  0.769  0.096  0.049           0.025   0.011   0.001   0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.37    2.53    2.85    2.64    5.76    0.48    0.67    2.02
10.78    2.67
 Exhst  HC:  1.14    1.35    1.53    1.41    2.21    0.48    0.67    2.02
 2.60    1.25
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
  7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.41    0.31    0.38    0.33    0.76
        0.38
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.10
 Exhst  CO: 15.78   17.93   19.76   18.55   51.30    1.04    1.18    8.14
17.86   16.75
 Exhst NOX:  1.62    1.91    2.03    1.95    6.07    1.40    1.61   16.84
 0.91    2.14

_____________________________________________________________________________
_______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
```

C·2-12-11

```
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
 ______ ______
 Veh. Spd.: 31.0   31.0   31.0          31.0   31.0   31.0   31.0
 31.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.33   2.49   2.80   2.59   5.64   0.46   0.65   1.96
10.72   2.62
 Exhst  HC:  1.11   1.32   1.49   1.38   2.11   0.46   0.65   1.96
 2.54   1.22
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.40   0.30   0.37   0.32   0.74
        0.37
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 15.41  17.54  19.32  18.14  49.74   1.00   1.14   7.88
17.19  16.34
 Exhst NOX:  1.62   1.92   2.04   1.97   6.12   1.39   1.60  16.76
 0.93   2.14

___________________________________________________________________
______________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes      Ambient Temp:   87.8
/ 87.8 / 87.8 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
 ______ ______
 Veh. Spd.: 32.0   32.0   32.0          32.0   32.0   32.0   32.0
 32.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
```

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________________________________________________________________________
____________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.20   2.37   2.66   2.47   5.31   0.43   0.60   1.81
10.54   2.49
 Exhst  HC:  1.02   1.23   1.39   1.28   1.85   0.43   0.60   1.81
 2.36   1.13
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
  7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.35   0.27   0.34   0.29   0.66
        0.33
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 14.43  16.50  18.17  17.07  45.94   0.92   1.05   7.23
15.42  15.28
 Exhst NOX:  1.64   1.95   2.07   1.99   6.27   1.38   1.59  16.67
 0.96   2.16

________________________________________________________________________
____________
0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
```

```
 Veh. Spd.: 35.0    35.0    35.0            35.0    35.0    35.0    35.0
 35.0
   VMT Mix:  0.769  0.096  0.049           0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.16   2.34   2.62   2.43   5.22   0.42   0.59   1.77
10.49   2.45
 Exhst  HC:  1.00   1.20   1.36   1.26   1.78   0.42   0.59   1.77
2.31    1.10
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.34   0.26   0.33   0.28   0.64
        0.31
 Rsting HC:  0.09   0.08   0.07   0.08   0.09
 0.56   0.10
 Exhst  CO: 14.14  16.20  17.83  16.75  44.93   0.90   1.02   7.05
14.90  14.97
 Exhst NOX:  1.64   1.96   2.08   2.00   6.31   1.38   1.60  16.69
 0.97   2.17

____________________________________________________________________

0Emission factors are as of July 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                    I/M Program: Yes       Ambient Temp:   87.8
/ 87.8 / 87.8 F
               Anti-tam. Program: No     Operating Mode:    20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______

 Veh. Spd.: 36.0    36.0    36.0            36.0    36.0    36.0    36.0
 36.0
   VMT Mix:  0.769  0.096  0.049           0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.12   2.30   2.58   2.40   5.13   0.41   0.57   1.73
10.44   2.41
 Exhst  HC:  0.98   1.18   1.33   1.23   1.71   0.41   0.57   1.73
2.26    1.08
 Evap.  HC:  0.55   0.56   0.62   0.58   2.30
 7.62   0.74
 Refuel HC:  0.19   0.24   0.24   0.24   0.41
        0.19
 Runing HC:  0.32   0.25   0.32   0.27   0.62
        0.30
```

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```
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
  0.56   0.10
 Exhst  CO: 13.87   15.93   17.51   16.46   44.05    0.88    1.00    6.89
14.42  14.68
 Exhst NOX:  1.65    1.97    2.09    2.01    6.36    1.39    1.60   16.73
 0.98    2.18

__________________________________________________________________
_______________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
                 Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 37.0   37.0   37.0           37.0   37.0   37.0   37.0
 37.0
   VMT Mix:  0.769  0.096  0.049          0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09    2.27    2.55    2.37    5.05    0.40    0.56    1.69
10.39   2.37
 Exhst  HC:  0.96    1.16    1.31    1.21    1.65    0.40    0.56    1.69
2.22   1.05
 Evap.  HC:  0.55    0.56    0.62    0.58    2.30
 7.62   0.74
 Refuel HC:  0.19    0.24    0.24    0.24    0.41
        0.19
 Runing HC:  0.31    0.24    0.31    0.26    0.60
        0.29
 Rsting HC:  0.09    0.08    0.07    0.08    0.09
 0.56   0.10
 Exhst  CO: 13.62   15.67   17.22   16.19   43.28    0.86    0.98    6.74
13.97  14.42
 Exhst NOX:  1.65    1.98    2.10    2.02    6.41    1.39    1.61   16.79
 0.99    2.18

__________________________________________________________________
_______________
0Emission  factors  are  as  of  July  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   87.8
/ 87.8 / 87.8 F
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APPENDIX C.3

MASSACHUSETTS HIGHWAY DEPARTMENT (MHD) TRANSPORTATION DATA

APPENDIX C.3

MHD DATA AND DOCUMENTATION

The Massachusetts Highway Department
The Bureau of State Highway Planning

Internal Memorandum

TO: Laurel Jenny Carlson
FROM: Charles F. Sterling, P.E.
SUBJECT: VMT Documentation

Date: February 19, 1992

Ken Santlal sent me a copy of your January 30, 1992 memo to him and others addressing VMT data. In a spirit of cooperation to fulfill our mutual goal of developing an effective and workable SIP I attempted to answer the ten issues with regard to VMT Documentation:

1. The method used for VMT forecasting is the method suggested by EPA in "Procedures for emission Inventory Preparation
Volume IV: Mobile Sources
JULY 1989".
The method used is detailed on pages 4-43 and 4-44 entitled: "a second method".

2. The method of deriving VMT for the appropriate seasons is also derived from the procedures used in 1. The basic assumption is the same, that the VMT is a function of road mileage and the mix of mileage by classification within each county will approximate the statewide travel as a function of the unique county mixture of functional class mileage.

3. The method of disaggregating VMT among functional systems on a Statewide Rural, Urbanized Area, and Small Urban Area is the method reported to FHWA under the HPMS procedures.

4. The method of calculating rural and local mileage is the same as the primary method described in 1.

5. No attempt is made to disaggregate VMT by nonattainment areas. MHD will supply VMT, speed, and seasonal factors to the best of our ability by County any further disaggregation will be done by others.

6. The method for adjusting traffic counts by day of the week, hour of the day and month are outlined in the "ASSHTO Guidelines for Traffic Data Programs" 1991, and also work by J. Buckholz "Revised Traffic Program" 1984.

7. MHD will address the VMT data that comes from HPMS sources. We have no data on cross boundary VMT all of our data is based on MA data only.

8. MHD will provide the number of miles of highway by functional class within each county.

9. Documentation of the traffic counts will be through the HPMS process. Specific counts will be provided as requested, but the basis of the VMT data is the statistical manipulation of a limited number of counts (less than a thousand statewide.)

10. Quality assurance will be provided by a review of all work by senior staff by random temporal checks on the products in process as well as a sample check of final products. We look at quality data is an integral part of our work process, not just a check for errors in the final product.

The speed data will be taken by our Traffic Engineering Speed Zone section. They will use both their "files" to determine the speeds on all functional classes by county and supplement this data with radar observations as needed.

FEB 2 2 199

The Commonwealth of Massachusetts
Executive Office of Transportation and Construction
Department of Public Works

Ten Park Plaza, Boston, MA 02116-3973

WILLIAM F. WELD
GOVERNOR
ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR
RICHARD L. TAYLOR
SECRETARY
JAMES J. KERASIOTES
COMMISSIONER

April 1, 1992

ECEIV
APR 1 1992
DIV. AIR QUAL CONT

Ms. Laurel J. Carlson
Deputy Director
Division of Air Quality Control
Department of Environmental Protection
One Winter St.
Boston, MA 02108

Dear Ms. Carlson:

In accordance with the 1992 State Implementation Plan, the Massachusetts Highway Department submits the enclosed transportation data package to the Department of Environmental Protection. The data, which will be used in the preparation of the 1990 Base Year Emissions Inventory, is required by the 1990 Clean Air Act Amendments.

The transportation data consists of the following:

1. 1990 Daily Vehicle Miles Traveled (DVMT) by county and roadway class, and stratified by urban, small urban and rural areas (All "urban" and "small urban" references are to functional class and reflect Highway Performance Monitoring System (HPMS) criteria). This includes roadway mileage by county, stratified by percentage of totals, and by urbanized, small urban and rural areas.

2. Projected DVMT to 1999 Attainment Year.

3. Seasonal DVMT variation.

4. Hourly DVMT profile.

5. Vehicle speeds by county and by functional class.

The source for base year mileage and DVMT is the Highway Performance Monitoring System. The DVMT forecasts are projected from the 1990 base, using a regression line estimated from the HPMS historical trend for each year from 1980 to 1990.

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APPENDIX

Speed data was compiled by our staff engineers in the Speed Data Collection Unit as part of an ongoing monitoring program.

If you have any questions about this submittal, please call Charles Sterling, Chief of Statewide Planning, at (617) 973-7315.

Sincerely,

William T. Steffens
Director of Transportation
Planning and Development

enc.
WTS/LPB/wpg
cc: P. Moynihan, MHD
T. McLoughlin, MHD
J. Grafe, DEP

MASS HIGHWAY

William F. Weld
Governor

Argeo Paul Cellucci
Lieutenant Governor

Richard L. Taylor
Secretary

James J. Kerasiotes
Commissioner

November 12, 1992

Laurel J. Carlson, Deputy Director
Division of Air Quality Control
Department of Environmental Protection
One Winter St.
Boston, MA 02108

Dear Ms. Carlson:

The attached package contains revised figures for the Statewide Transportation Inventory, originally submitted by the Massachusetts Highway Department on April 1, 1992.

All revisions have been made to the distribution of roadway mileage by functional class within the urbanized and small urban areas. Changes were made to roadway classifications 2, 3 and 4 within urbanized areas, and on classifications 2 and 3 within small urban areas. I would like to emphasize that the revisions affect only the distribution of roadway mileage by roadway class. No changes have been made to either total roadway mileage or to base or projected VMT.

I have also enclosed a table of total DVMT, stratified by urban, small urban and rural type. This information was requested by Nick Stratis of your staff.

If you have any questions, please call me at 973-7313.

Sincerely,

Daniel F. Beagan
Director
Bureau of Transportation
Planning and Development

Massachusetts Highway Department • Ten Park Plaza, Boston, MA 02116-3973 • (617) 973-7500

attach.
DFB/LBP/
cc: P. Moynihan
W. Steffens
C. Papazian
K. Fox
K. Santel
M. Hanley

APPENDIX

BARNSTABLE COUNTY

Urbanized Area:

Classification	Mileage	% of urban area	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Small Urban

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	14.93	24%	243	242	251	259	268	277	285	294	303	311
3	40.21	26%	547	558	563	567	572	576	581	585	590	594
4	65.18	27%	286	280	279	278	276	275	274	272	271	270
5	97.84	36%	301	337	359	380	401	423	444	466	487	509
6	571.62	43%	572	725	848	972	1,095	1,218	1,341	1,465	1,588	1,711
TOTAL	789.78		1,949	2,142	2,299	2,456	2,612	2,769	2,925	3,082	3,239	3,396

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	28.12	11%	460	490	504	519	534	549	563	578	593	608
3	75.81	10%	536	546	559	572	585	598	611	624	637	650
4	174.47	9%	377	384	384	385	386	387	387	388	389	390
5	186.50	10%	98	91	84	77	69	62	55	48	41	34
6	1,255.91	16%	440	561	658	755	852	950	1,047	1,144	1,242	1,339
TOTAL	1,720.81		1,910	2,071	2,189	2,308	2,427	2,546	2,665	2,783	2,902	3,021

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APPENDIX

BERKSHIRE COUNTY

Urbanized Area: PITTSFIELD (199) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	28.43	100%	397	403	413	423	433	442	452	462	472	481
4	33.45	100%	165	174	177	180	183	186	189	191	194	197
5	40.45	100%	139	140	143	147	150	154	157	161	164	168
6	168.07	100%	179	217	249	281	314	346	378	410	442	475
TOTAL	270.40		880	934	982	1,031	1,080	1,128	1,176	1,224	1,272	1,321

Small Urban

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	24.42	39%	398	396	410	424	438	452	467	481	495	509
3	1.85	1%	25	26	26	26	26	27	27	27	27	27
4	14.39	6%	63	62	62	61	61	61	60	60	60	60
5	36.75	13%	113	126	135	143	151	159	167	175	183	191
6	100.02	8%	100	127	148	170	192	213	235	256	278	299
TOTAL	177.43		699	737	781	824	868	912	956	999	1,043	1,087

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	23.98	14%	825	899	936	974	1,011	1,049	1,087	1,124	1,161	1,199
2	61.70	25%	1,009	1,074	1,107	1,139	1,172	1,204	1,236	1,269	1,301	1,334
3	94.63	12%	666	682	698	714	731	747	763	779	796	812
4	206.50	10%	449	454	455	456	457	458	459	459	460	461
5	262.82	13%	137	128	118	108	98	88	78	68	58	48
6	844.23	10%	295	377	442	508	573	638	704	769	835	900
TOTAL	1,493.86		3,382	3,613	3,756	3,899	4,041	4,183	4,326	4,469	4,611	4,754

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BRISTOL COUNTY

Urbanized Area: BROCKTON (147) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	6.89	38%	322	356	382	408	433	459	485	511	537	562
3	4.37	7%	71	71	72	73	74	74	75	76	77	77
4	17.06	16%	126	123	124	124	125	125	126	126	127	127
5	17.38	19%	57	24	26	27	29	30	32	33	35	36
6	64.89	16%	90	116	137	158	179	201	222	243	264	286
TOTAL	110.59		666	691	741	790	840	890	939	989	1,039	1,089

Urbanized Area: FALL RIVER (130) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	14.27	100%	772	807	835	863	892	920	948	976	1,004	1,032
2	14.36	100%	470	515	543	572	601	629	658	686	715	744
3	40.60	100%	369	342	322	302	282	261	241	221	200	180
4	44.91	100%	305	294	284	275	265	256	246	236	227	217
5	52.25	100%	178	171	164	158	151	145	138	131	125	118
6	325.90	100%	562	741	889	1,036	1,183	1,330	1,477	1,625	1,772	1,919
TOTAL	492.29		2,656	2,870	3,037	3,206	3,374	3,541	3,708	3,875	4,043	4,210

Urbanized Area: NEW BEDFORD (127) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	11.16	100%	465	483	501	520	539	558	577	595	614	633
2	11.88	100%	373	398	417	436	455	474	493	511	530	549
3	34.14	100%	372	360	349	338	327	316	304	293	282	271
4	80.81	100%	483	504	514	525	536	547	558	568	579	590
5	65.47	100%	213	214	221	228	235	243	250	257	264	272
6	340.44	100%	364	441	507	573	638	704	770	836	902	967
TOTAL	543.90		2,270	2,400	2,509	2,620	2,730	2,842	2,952	3,060	3,171	3,282

Urbanized Area: PROVIDENCE (26) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	18.30	82%	959	1,019	1,073	1,126	1,180	1,233	1,286	1,340	1,393	1,446
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	62.89	70%	679	705	721	736	752	768	783	799	814	830
4	57.43	68%	216	224	224	224	223	222	222	221	221	220
5	107.28	77%	323	324	334	344	354	364	374	384	394	404
6	290.84	76%	319	404	475	545	616	686	756	827	897	968
TOTAL	536.74		2,496	2,677	2,827	2,975	3,125	3,272	3,421	3,571	3,719	3,868

APPENDIX

BRISTOL COUNTY (cont.)

Urbanized Area:
TAUNTON (332)

Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	17.19	74%	704	787	843	898	953	1,008	1,064	1,119	1,175	1,230
2	42.79	69%	322	365	387	409	431	453	475	496	518	540
3	7.83	46%	289	330	342	354	366	377	389	401	413	425
4	78.32	88%	300	321	321	322	324	325	326	327	328	329
5	66.36	81%	198	195	202	209	218	225	232	240	248	255
6	291.13	91%	132	135	136	136	137	137	137	138	138	139
TOTAL	503.62		1,945	2,133	2,232	2,328	2,428	2,526	2,623	2,720	2,818	2,917

Small Urban

Classification	Mileage	% of State	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	12.63	5%	207	220	227	233	240	246	253	260	266	273
3	9.93	1%	70	72	73	75	77	78	80	82	83	85
4	102.26	5%	221	225	225	226	226	227	227	228	228	228
5	76.06	4%	40	37	34	31	28	25	23	20	17	14
6	239.57	3%	84	107	125	144	163	181	200	218	237	255
TOTAL	440.45		621	660	685	709	734	758	782	807	831	856

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DUKES COUNTY

Urbanized Area:

Classification	Mileage	% of urban area	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Small Urban

Classification	Mileage	% of State	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	14.92	2%	105	107	110	113	115	118	120	123	125	128
4	33.88	2%	73	74	75	75	75	75	75	75	76	76
5	53.35	3%	28	26	24	22	20	18	16	14	12	10
6	75.16	1%	26	34	39	45	51	57	63	68	74	80
TOTAL	177.31		233	241	248	255	261	267	274	281	287	293

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ESSEX COUNTY

Urbanized Area:
BOSTON (7)

Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	9.60	7%	1,018	1,104	1,148	1,192	1,237	1,281	1,325	1,369	1,414	1,458
2	53.25	27%	1,692	1,827	1,863	1,899	1,935	1,970	2,006	2,042	2,078	2,114
3	81.83	12%	1,460	1,399	1,356	1,313	1,269	1,226	1,183	1,140	1,096	1,053
4	145.01	15%	959	966	955	944	933	922	911	900	889	878
5	136.69	11%	387	388	389	389	389	390	390	390	391	391
6	912.12	15%	1,066	1,287	1,470	1,652	1,835	2,018	2,201	2,384	2,567	2,750
TOTAL	1,338.50		6,583	6,971	7,180	7,389	7,598	7,807	8,017	8,226	8,435	8,644

Urbanized Area:
LAWRENCE-HAVERHILL (104)

Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	34.13	100%	2,661	2,750	2,856	2,962	3,068	3,174	3,280	3,386	3,491	3,597
2	12.07	100%	160	173	182	191	199	208	217	225	234	243
3	71.73	100%	1,028	1,001	971	941	911	881	851	821	791	761
4	107.52	100%	774	788	815	841	867	894	920	947	973	1,000
5	127.29	100%	373	368	368	369	369	370	370	371	371	372
6	571.26	100%	611	766	899	1,032	1,165	1,298	1,430	1,563	1,696	1,829
TOTAL	924.00		5,607	5,846	6,091	6,336	6,579	6,825	7,068	7,313	7,556	7,802

Small Urban

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	9.76	62%	341	322	327	333	339	344	350	355	361	366
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	20.34	13%	277	282	285	287	289	291	294	296	298	301
4	30.13	12%	132	129	129	128	128	127	126	126	125	125
5	24.66	9%	76	85	90	96	101	107	112	117	123	128
6	92.20	7%	92	117	137	157	177	196	216	236	256	276
TOTAL	177.09		918	935	968	1,001	1,033	1,066	1,098	1,131	1,163	1,196

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	12.85	8%	442	482	502	522	542	562	582	602	622	643
2	6.74	3%	110	117	121	124	128	132	135	139	142	146
3	36.08	5%	255	260	266	272	279	285	291	297	303	310
4	100.38	5%	217	221	221	222	222	222	223	223	224	224
5	51.63	3%	27	25	23	21	19	17	15	13	11	9
6	344.73	4%	121	154	181	207	234	261	287	314	341	368
TOTAL	552.41		1,172	1,259	1,314	1,369	1,424	1,479	1,534	1,589	1,644	1,699

FRANKLIN COUNTY

Urbanized Area:

Classification	Mileage	% of urban area	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Small Urban

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	5.98	38%	209	197	201	204	207	211	214	218	221	225
2	3.31	5%	54	54	56	58	59	61	63	65	67	69
3	6.34	7%	86	88	89	89	90	91	92	92	93	94
4	20.00	4%	88	86	86	85	85	84	84	84	83	83
5	15.89	8%	49	55	58	62	65	69	72	76	79	83
6	75.80	6%	76	96	112	129	145	162	178	194	211	227
TOTAL	127.32		561	576	601	627	652	678	703	729	754	780

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	17.84	11%	614	669	697	724	752	780	808	836	864	892
2	41.29	17%	675	719	741	762	784	806	827	849	871	893
3	66.97	9%	473	483	494	506	517	528	540	552	563	575
4	250.75	13%	542	551	552	554	555	556	557	558	559	560
5	221.57	11%	116	108	99	91	82	74	66	57	49	40
6	981.14	12%	343	438	514	590	666	742	818	894	970	1,046
TOTAL	1,579.56		2,763	2,967	3,097	3,227	3,357	3,486	3,616	3,746	3,876	4,006

HAMPDEN COUNTY

Urbanized Area: SPRINGFIELD (43) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	52.46	89%	2,159	2,279	2,339	2,400	2,461	2,521	2,583	2,643	2,703	2,765
2	11.45	60%	178	183	191	199	207	216	223	232	240	248
3	183.05	85%	2,361	2,800	2,855	2,908	2,963	3,017	3,071	3,125	3,180	3,234
4	202.88	77%	1,517	1,440	1,471	1,501	1,530	1,561	1,591	1,621	1,652	1,682
5	164.88	83%	573	577	594	612	630	647	665	682	701	718
6	1,239.06	85%	1,113	1,301	1,456	1,610	1,765	1,920	2,074	2,229	2,384	2,539
TOTAL	1,853.78		7,901	8,579	8,906	9,230	9,557	9,883	10,207	10,533	10,859	11,185

Small Urban

Classification	Mileage	% of State	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	24.19	14%	833	907	945	982	1,020	1,058	1,096	1,134	1,172	1,210
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	48.55	6%	343	350	358	366	375	383	391	400	408	417
4	163.86	8%	354	360	361	362	362	363	364	365	365	366
5	108.80	6%	57	53	49	45	40	36	32	28	24	20
6	493.66	6%	173	220	259	297	335	373	412	450	488	526
TOTAL	839.06		1,759	1,890	1,971	2,052	2,133	2,214	2,295	2,376	2,457	2,538

HAMPSHIRE COUNTY

Urbanized Area: SPRINGFIELD (43) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	6.57	11%	270	285	293	301	308	316	323	331	339	346
2	7.56	40%	117	120	126	131	137	142	148	153	158	164
3	32.01	15%	413	490	499	509	518	528	537	547	556	565
4	61.71	23%	462	438	447	456	466	475	484	493	502	511
5	33.24	17%	115	116	120	123	127	131	134	138	141	145
6	224.51	15%	202	236	264	292	320	348	376	404	432	460
TOTAL	365.6		1,579	1,686	1,749	1,812	1,875	1,939	2,002	2,065	2,129	2,192

Small Urban

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	25.82	16%	351	358	361	364	367	370	373	376	379	382
4	21.35	9%	94	92	91	91	90	90	90	89	89	88
5	12.92	5%	40	44	47	50	53	56	59	61	64	67
6	91.68	7%	92	116	136	156	176	195	215	235	255	274
TOTAL	151.77		576	611	636	661	686	711	736	761	787	812

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	3.73	2%	128	140	146	151	157	163	169	175	181	187
2	19.82	8%	324	345	355	366	376	387	397	408	418	429
3	71.04	9%	502	512	524	536	548	561	573	585	597	609
4	167.12	8%	361	367	368	369	370	370	371	372	373	373
5	143.56	7%	75	70	64	59	53	48	42	37	32	26
6	621.60	8%	218	277	326	374	422	470	518	566	615	663
TOTAL	1,026.87		1,608	1,711	1,783	1,855	1,927	1,999	2,071	2,143	2,215	2,287

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MIDDLESEX COUNTY

Urbanized Areas:
BOSTON (7)

Classification	Mileage	% of total	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	65.22	45%	6,913	7,499	7,800	8,101	8,401	8,702	9,003	9,304	9,605	9,905
2	62.70	31%	1,985	2,144	2,185	2,228	2,270	2,311	2,354	2,395	2,438	2,479
3	274.81	39%	4,904	4,698	4,553	4,408	4,263	4,117	3,972	3,827	3,682	3,537
4	331.28	33%	2,192	2,207	2,181	2,157	2,132	2,106	2,081	2,057	2,031	2,006
5	589.87	27%	1,674	1,678	1,679	1,681	1,682	1,683	1,685	1,686	1,688	1,689
6	2428.40	40%	2,837	3,425	3,912	4,399	4,886	5,373	5,860	6,347	6,834	7,321
TOTAL	3752.28		20,506	21,651	22,312	22,973	23,634	24,294	24,956	25,616	26,277	26,938

Urbanized Area:
LOWELL (136)

Classification	Mileage	% of total	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	14.96	100%	1,273	1,392	1,459	1,526	1,594	1,661	1,728	1,796	1,863	1,930
2	17.06	100%	1,367	1,485	1,545	1,605	1,665	1,725	1,785	1,844	1,904	1,964
3	65.33	100%	759	749	736	723	710	696	683	670	656	643
4	116.26	100%	833	840	847	853	860	866	873	879	885	892
5	154.51	100%	484	475	463	450	438	425	413	401	388	376
6	629.26	100%	1,032	1,389	1,676	1,964	2,251	2,539	2,826	3,113	3,401	3,688
TOTAL	997.38		5,748	6,330	6,726	7,121	7,518	7,912	8,308	8,703	9,097	9,493

Small Urban

Classification	Mileage	% of State	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	15.30	9%	527	573	597	621	645	669	693	717	741	765
2	10.15	7%	166	177	182	187	193	198	203	209	214	219
3	68.75	9%	486	495	507	519	531	543	554	566	578	590
4	113.16	6%	244	249	249	250	250	251	251	252	252	253
5	127.52	7%	67	62	57	52	47	43	38	33	28	23
6	522.25	6%	183	233	274	314	354	395	435	476	516	557
TOTAL	857.13		1,672	1,789	1,867	1,944	2,021	2,098	2,175	2,253	2,330	2,407

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NANTUCKET COUNTY

Urbanized Area:

Classification	Mileage	% of urban area DVMT	1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Small Urban

Classification	Mileage	% of State DVMT	1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Rural

Classification	Mileage	% of State DVMT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	25.63	1%	55	56	56	57	57	57	57	57	57	57
5	27.23	1%	14	13	12	11	10	9	8	7	6	5
6	84.51	1%	30	38	44	51	57	64	70	77	84	90
TOTAL	137.37		99	107	113	119	124	130	135	141	147	152

NORFOLK COUNTY

Urbanized Area: BOSTON (7) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	45.31	31%	4,803	5,210	5,419	5,628	5,837	6,046	6,255	6,463	6,673	6,881
2	31.47	16%	996	1,076	1,097	1,118	1,139	1,160	1,181	1,202	1,223	1,244
3	187.23	27%	3,341	3,201	3,102	3,003	2,904	2,805	2,706	2,608	2,508	2,410
4	282.31	28%	1,868	1,881	1,859	1,838	1,817	1,795	1,774	1,753	1,731	1,710
5	302.06	24%	857	859	860	861	861	862	863	864	864	865
6	1,586.37	26%	1,853	2,238	2,556	2,874	3,192	3,510	3,828	4,146	4,465	4,783
TOTAL	2,434.75		13,719	14,464	14,892	15,321	15,750	16,178	16,607	17,036	17,464	17,893

Urbanized Area: PROVIDENCE (26) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	4.07	18%	213	227	239	251	262	274	286	298	310	322
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	19.92	30%	285	296	303	309	316	322	329	335	342	348
4	11.74	14%	44	46	46	46	46	45	45	45	45	45
5	27.67	20%	83	83	86	89	91	94	96	99	102	104
6	73.50	19%	81	102	120	138	156	173	191	209	227	245
TOTAL	136.90		706	754	793	832	871	909	948	987	1025	1064

Urbanized Area: BROCKTON (147) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	2.38	13%	111	123	132	141	150	159	168	176	185	194
3	1.58	3%	26	26	26	26	27	27	27	27	28	28
4	7.38	7%	55	53	54	54	54	54	54	55	55	55
5	4.18	4%	14	15	16	16	17	18	19	20	21	22
6	18.24	4%	25	32	38	44	50	56	62	68	74	80
Norfolk: TOTAL 1/2	33.76		230	249	266	282	298	314	331	347	363	379

Norfolk (cont.)

Small Urban

Classification	Mileage	% of State	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	3.66	2%	126	137	143	149	154	160	166	172	177	183
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	16.55	2%	117	119	122	125	128	131	133	136	139	142
4	23.25	1%	50	51	51	51	51	52	52	52	52	52
5	15.88	1%	8	8	7	7	6	5	5	4	3	3
6	81.56	1%	29	36	43	49	55	62	68	74	81	87
TOTAL	140.90		330	352	366	380	395	409	424	438	452	467

Norfolk 2/2

PLYMOUTH COUNTY

Urbanized Areas:
BOSTON (7)

Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	4.97	2%	157	170	173	177	180	183	187	190	193	197
3	36.18	56%	646	619	599	580	561	542	523	504	485	466
4	78.99	86%	523	526	520	514	508	502	496	490	484	478
5	89.72	76%	255	255	255	256	256	256	256	256	257	257
6	297.65	5%	348	420	480	539	599	659	718	778	838	897
TOTAL	507.51		1,928	1,990	2,028	2,066	2,104	2,142	2,180	2,219	2,257	2,295

Urbanized Area:
BROCKTON (147)

Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	8.90	49%	415	460	493	527	560	593	626	660	693	726
3	52.99	90%	861	866	875	884	893	902	911	920	930	939
4	81.67	72%	605	591	593	595	597	600	602	604	607	609
5	71.96	77%	235	252	269	284	299	315	330	345	361	376
6	334.13	80%	463	595	705	814	923	1,033	1,142	1,252	1,361	1,470
TOTAL	549.65		2,580	2,764	2,935	3,104	3,272	3,442	3,611	3,781	3,951	4,120

Urbanized Area:
TAUNTON (332)

Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	5.89	26%	241	270	289	308	327	346	364	383	402	421
2	0.63	1%	5	5	6	6	6	7	7	7	8	8
3	8.20	54%	340	388	402	415	429	444	458	471	485	499
4	10.85	13%	41	44	45	45	45	45	45	45	45	46
5	15.38	16%	46	45	47	49	50	52	54	56	57	58
6	28.09	9%	13	13	13	13	13	13	13	13	13	13
TOTAL	70.04		686	766	801	835	871	906	941	976	1011	1046

Plymouth 1/2

PLYMOUTH COUNTY (cont.)

Small Urban

Classification	Mileage	% of State	DVMT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	7.81	12%		127	127	131	136	140	145	149	154	158	163
3	27.55	18%		375	382	386	389	392	395	398	401	404	407
4	22.72	8%		100	98	97	97	96	96	95	95	95	94
5	26.04	10%		80	90	95	101	107	113	118	124	130	135
6	120.52	9%		121	153	179	205	231	257	283	309	335	361
TOTAL	204.64			802	849	888	927	966	1,005	1,044	1,083	1,121	1,160

Rural

Classification	Mileage	% of State	DVMT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	23.55	14%		811	883	920	956	993	1,030	1,067	1,104	1,141	1,178
2	38.41	16%		628	669	689	709	729	749	770	790	810	830
3	43.73	6%		309	315	323	330	338	345	353	360	368	375
4	189.79	9%		410	417	418	419	420	421	421	422	423	424
5	282.98	15%		148	138	127	116	105	94	84	73	62	51
6	939.81	12%		329	419	492	565	638	711	784	856	929	1,002
TOTAL	1,518.27			2,635	2,841	2,968	3,096	3,223	3,350	3,478	3,606	3,733	3,861

Plymouth 2/2

SUFFOLK COUNTY

Urbanized Area: BOSTON (7) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	14.44	10%	1,531	1,660	1,727	1,794	1,860	1,927	1,993	2,060	2,126	2,193
2	44.67	22%	1,414	1,527	1,557	1,587	1,617	1,647	1,677	1,707	1,737	1,766
3	109.68	16%	1,957	1,875	1,817	1,759	1,701	1,643	1,585	1,528	1,469	1,412
4	129.73	13%	858	864	854	845	835	825	815	805	795	786
5	98.64	8%	280	281	281	281	281	282	282	282	282	282
6	708.16	12%	827	999	1,141	1,283	1,425	1,567	1,709	1,851	1,993	2,135
TOTAL	1,105.32		6,868	7,206	7,377	7,548	7,719	7,890	8,061	8,232	8,403	8,574

Small Urban

Classification	Mileage	% of State	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

Rural

Classification	Mileage	% of State	DVMT 1990
1	0.00	-----	-----
2	0.00	-----	-----
3	0.00	-----	-----
4	0.00	-----	-----
5	0.00	-----	-----
6	0.00	-----	-----
TOTAL	0.00		

WORCESTER COUNTY

Urbanized Area: BOSTON (7) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	9.28	6%	984	1,067	1,110	1,153	1,195	1,238	1,281	1,324	1,367	1,409
2	3.66	5%	116	125	128	130	132	135	137	140	142	145
3	13.01	2%	232	222	216	209	202	195	188	181	174	167
4	29.96	3%	198	200	197	195	193	190	188	186	184	181
5	29.56	2%	84	84	84	84	84	84	84	85	85	85
6	106.09	2%	124	150	171	192	213	235	256	277	299	320
TOTAL	191.56		1,738	1,848	1,905	1,963	2,020	2,078	2,135	2,193	2,250	2,307

Urbanized Area: WORCESTER (76) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	58.11	100%	2,856	3,212	3,395	3,578	3,762	3,945	4,128	4,312	4,495	4,678
2	45.62	100%	596	608	617	626	635	644	652	661	670	679
3	157.83	100%	2,277	2,435	2,488	2,540	2,593	2,646	2,698	2,751	2,803	2,856
4	222.01	100%	771	969	979	989	998	1,008	1,017	1,027	1,037	1,046
5	190.21	100%	273	284	288	292	297	301	306	310	315	319
6	973.61	100%	664	730	785	839	894	948	1,002	1,057	1,111	1,166
TOTAL	1,647.39		7,437	8,238	8,552	8,864	9,179	9,492	9,803	10,118	10,431	10,744

Urbanized Area: FITCHBURG-LEOMINSTER (189) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	1.70	100%	48	49	52	55	59	62	65	68	71	74
2	20.53	100%	406	421	440	459	478	497	516	535	554	573
3	32.25	100%	481	507	512	516	520	524	529	533	537	542
4	35.36	100%	131	134	136	139	141	144	146	149	151	154
5	57.69	100%	184	187	193	198	204	210	216	222	227	233
6	241.46	100%	137	169	195	221	247	273	298	324	350	376
TOTAL	388.99		1,387	1,467	1,528	1,588	1,649	1,710	1,770	1,831	1,890	1,952

Urbanized Area: PROVIDENCE (26) Classification	Mileage	% of urban area	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	0.32	0%	1	1	1	1	1	1	1	1	1	1
4	14.74	18%	56	58	57	57	57	57	57	57	57	57
5	4.26	3%	13	13	13	14	14	14	15	15	16	16
6	18.23	5%	20	25	30	34	39	43	47	52	56	61
TOTAL	37.55		89	97	101	106	111	115	120	125	130	134

RCESTER COUNTY (cont.)

Small Urban

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	12.04	19%	196	195	202	209	216	223	230	237	244	251
3	35.27	22%	480	490	494	498	502	505	509	513	517	521
4	69.46	29%	304	298	297	296	294	293	292	290	289	288
5	59.88	22%	184	206	219	233	246	259	272	285	298	311
6	262.48	20%	263	333	389	446	503	559	616	673	729	786
TOTAL	439.13		1,427	1,522	1,602	1,681	1,760	1,840	1,919	1,998	2,078	2,157

Rural

Classification	Mileage	% of State	DVMT 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	42.57	25%	1,465	1,595	1,662	1,729	1,796	1,862	1,929	1,995	2,062	2,129
2	37.71	11%	453	482	497	512	526	541	555	570	584	599
3	215.14	28%	1,520	1,550	1,587	1,624	1,661	1,698	1,735	1,772	1,809	1,846
4	454.19	23%	981	999	1,001	1,003	1,005	1,007	1,009	1,011	1,013	1,015
5	382.11	20%	205	191	176	161	146	131	116	101	86	71
6	1,607.00	20%	562	717	842	966	1,091	1,215	1,340	1,464	1,589	1,713
TOTAL	2,738.72		5,187	5,534	5,764	5,994	6,224	6,453	6,683	6,913	7,143	7,373

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APPENDIX

DVMT ('000's)	Rural	Sm Urban	Urban	Total
1990	23,371	6,932	96,205	126,508
1991	25,035	7,371	102,610	135,016
1992	26,121	7,776	106,469	140,366
1993	27,206	8,177	110,321	145,704
1994	28,290	8,578	114,183	151,051
1995	29,373	8,979	118,037	156,389
1996	30,459	9,381	121,884	161,724
1997	31,544	9,783	125,738	167,065
1998	32,629	10,185	129,591	172,405
1999	33,713	10,587	133,450	177,750

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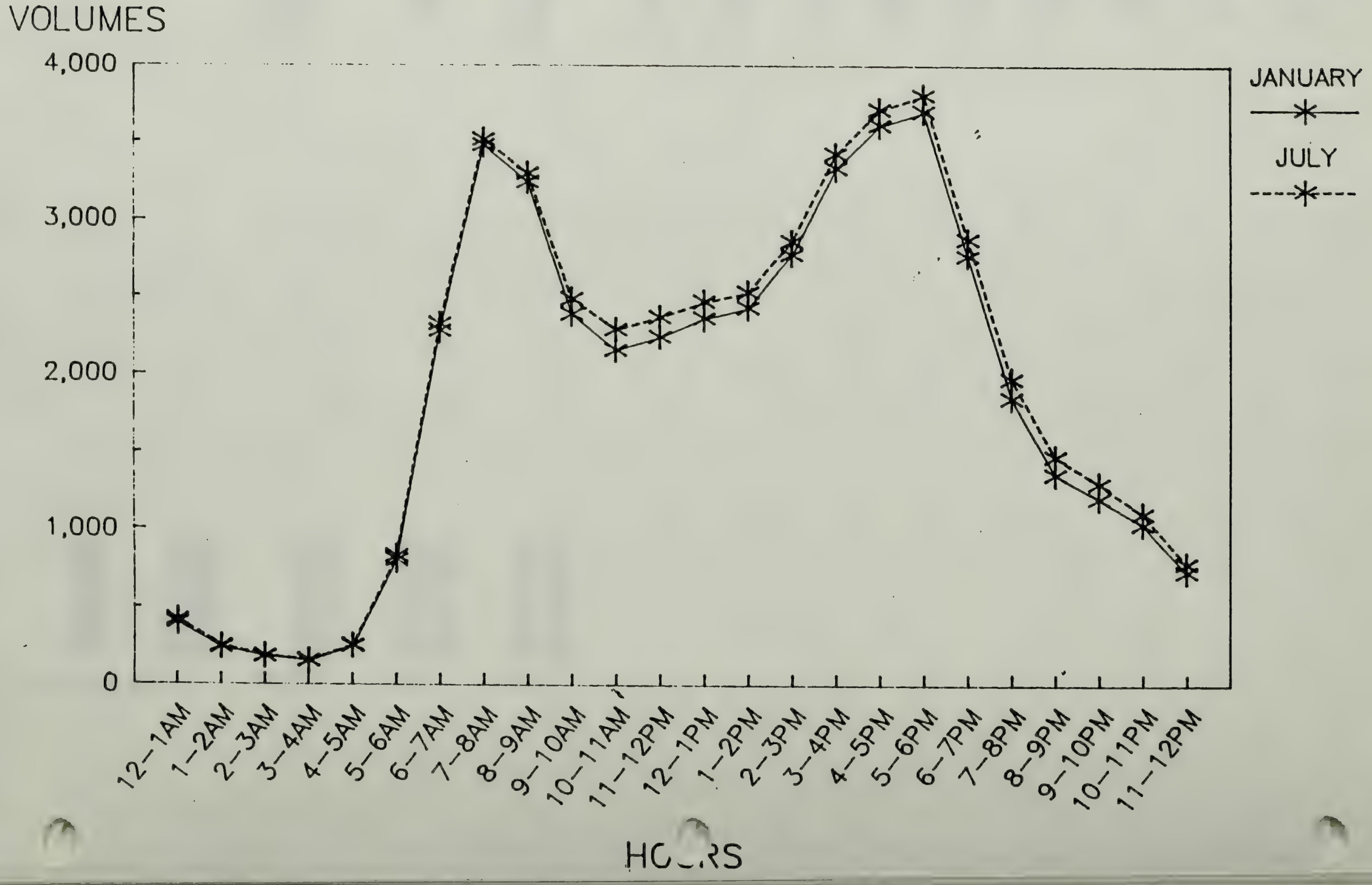
AVERAGE WEEKDAY VOLUMES
COMBINED PERMANENT STATIONS
JANUARY AND JULY 1991



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January 1991 Permanent Counts Average Week Day

	12:00 to 1:00 am	1:00 to 2:00 am	2:00 to 3:00 am	3:00 to 4:00 am	4:00 to 5:00 am	5:00 to 6:00 am	6:00 to 7:00 am	7:00 to 8:00 am	8:00 to 9:00 am	9:00 to 10:00 am	10:00 to 11:00 am	11:00 to 12:00 pm	12:00 to 1:00 pm	1:00 to 2:00 pm	2:00 to 3:00 pm	3: 4:
TAVWD	28,467	17,326	13,107	11,153	18,000	57,309	161,721	246,787	230,046	169,431	152,863	159,022	167,618	172,378	196,719	2
%DAV	0.89%	0.54%	0.41%	0.35%	0.56%	1.80%	5.07%	7.73%	7.21%	5.31%	4.79%	4.98%	5.25%	5.40%	6.16%	
AAVWD	401	244	185	157	254	807	2,278	3,476	3,240	2,386	2,153	2,240	2,361	2,428	2,771	
%DAV	0.89%	0.54%	0.41%	0.35%	0.57%	1.80%	5.07%	7.73%	7.21%	5.31%	4.79%	4.98%	5.25%	5.40%	6.17%	

July 1991 Permanent Counts Average Week Day

	12:00 to 1:00 am	1:00 to 2:00 am	2:00 to 3:00 am	3:00 to 4:00 am	4:00 to 5:00 am	5:00 to 6:00 am	6:00 to 7:00 am	7:00 to 8:00 am	8:00 to 9:00 am	9:00 to 10:00 am	10:00 to 11:00 am	11:00 to 12:00 pm	12:00 to 1:00 pm	1:00 to 2:00 pm	2:00 to 3:00 pm	3: 4:
TAVWD	30,047	17,942	13,356	11,291	18,479	58,989	164,780	249,381	233,805	176,238	162,505	168,080	175,098	179,292	203,107	2
%DAV	0.91%	0.54%	0.40%	0.34%	0.56%	1.78%	4.97%	7.53%	7.06%	5.32%	4.90%	5.07%	5.28%	5.41%	6.13%	
AAVWD	423	253	188	159	260	831	2,321	3,512	3,293	2,482	2,289	2,367	2,466	2,525	2,861	
%DAV	0.91%	0.54%	0.40%	0.34%	0.56%	1.78%	4.97%	7.53%	7.06%	5.32%	4.91%	5.07%	5.28%	5.41%	6.13%	

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	8:00 to 9:00 am	9:00 to 10:00 am	10:00 to 11:00 am	11:00 to 12:00 pm	12:00 to 1:00 pm	1:00 to 2:00 pm	2:00 to 3:00 pm	3:00 to 4:00 pm	4:00 to 5:00 pm	5:00 to 6:00 pm	6:00 to 7:00 pm	7:00 to 8:00 pm	8:00 to 9:00 pm	10:00 to 11:00 pm	10:00 to 11:00 pm	11:00 to 12:00 am	TOTALS
7	230,046	169,431	152,863	159,022	167,618	172,378	196,719	236,359	256,041	262,206	195,880	131,012	96,264	85,293	73,568	52,447	3,191,017
3%	7.21%	5.31%	4.79%	4.98%	5.25%	5.40%	6.16%	7.41%	8.02%	8.22%	6.14%	4.11%	3.02%	2.67%	2.31%	1.64%	100.00%
6	3,240	2,386	2,153	2,240	2,361	2,428	2,771	3,329	3,606	3,693	2,759	1,845	1,356	1,201	1,036	739	44,945
3%	7.21%	5.31%	4.79%	4.98%	5.25%	5.40%	6.17%	7.41%	8.02%	8.22%	6.14%	4.11%	3.02%	2.67%	2.31%	1.64%	100.00%

	8:00 to 9:00 am	9:00 to 10:00 am	10:00 to 11:00 am	11:00 to 12:00 pm	12:00 to 1:00 pm	1:00 to 2:00 pm	2:00 to 3:00 pm	3:00 to 4:00 pm	4:00 to 5:00 pm	5:00 to 6:00 pm	6:00 to 7:00 pm	7:00 to 8:00 pm	8:00 to 9:00 pm	10:00 to 11:00 pm	10:00 to 11:00 pm	11:00 to 12:00 am	TOTALS
31	233,805	176,238	162,505	168,080	175,098	179,292	203,107	242,884	263,224	269,895	203,899	139,696	104,430	92,239	78,533	56,159	3,313,349
53%	7.06%	5.32%	4.90%	5.07%	5.28%	5.41%	6.13%	7.33%	7.94%	8.15%	6.15%	4.22%	3.15%	2.78%	2.37%	1.69%	100.00%
12	3,293	2,482	2,289	2,367	2,466	2,525	2,861	3,421	3,707	3,801	2,872	1,968	1,471	1,299	1,106	791	46,666
53%	7.06%	5.32%	4.91%	5.07%	5.28%	5.41%	6.13%	7.33%	7.94%	8.15%	6.15%	4.22%	3.15%	2.78%	2.37%	1.70%	100.00%

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TABLE 1 SPEEDS FOR MOBILE SOURCE INVENTORY (Revised) 1/93

TABLE 1 SPEEDS FOR MOBILE URCE INVENTORY (Revised) 1/93
(50th Percentile)

COUNTY:	CLASS: U1	U2	U3	U4	U5	U6	R1	R2	R3	R4	R5	R6
BERKSHIRE	--	48	39	40	39	20	60	53	38	40	33	29
FRANKLIN	58	48	36	32	34	33	58	48	44	43	35	30
HAMPSHIRE	59	46	35	32	28	20	59	46	43	33	39	37
HAMPDEN	59	44	42	39	37	24	60	--	42	37	36	29
WORCESTER	54	57	45	39	40	28	59	43	53	40	35	25
MIDDLESEX	60	54	44	44	25	28	60	42	43	39	33	34
ESSEX	60	50	42	33	36	25	59	50	50	40	33	20
SUFFOLK	57	56	34	30	31	29	--	--	--	--	--	--
NORFOLK	60	45	39	36	32	29	60	--	52	39	39	31
BRISTOL	59	50	42	32	33	31	--	58	40	39	34	36
PLYMOUTH	60	60	44	40	29	28	60	58	51	48	31	27
BARNSTABLE	--	60	40	35	37	27	--	50	42	40	37	23
DUKES	--	--	--	--	--	--	--	--	34	39	32	27
NANTUCKET	--	--	--	--	--	--	--	--	--	35	40	23

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                 VMT 1990 URBAN AND SMALL URBAN (REVISED 11/13/92)

4vmturb
dec 18 92
           URBAN          INTS  FREEW PR.ART MNCOL MJCOL  LOCL     1990
COUNTIES   AREA   LEVEL     U1     U2     U3    U4    U5    U6    TOTAL
-------    -----  -----  -----  -----  -----  ----- ----- -----    =====

BARNSTABLE        URBAN      0    243    547   286   301   572     1949

BERKSHIRE  PITTS  URBAN      0      0    397   165   139   179      880
                 SM.URBN     0    398     25    63   113   100      699

                 URB TOT     0    398    422   228   252   279     1579

BRISTOL    BROCK  URBAN      0    322     71   126    57    90      666
           F.RIV  URBAN    772    470    369   305   178   562     2656
           N.BEDF URBAN    465    373    372   483   213   364     2270
           PROVID URBAN    959      0    679   216   323   319     2496
           TAUNT  URBAN    704    322    289   300   198   132     1945
                 SM.URBN     0      0      0     0     0     0        0

                 URB TOT  2900   1487   1780  1430   969  1467    10033

DUKES             URBAN      0      0      0     0     0     0        0

ESSEX      BOST   URBAN   1018   1692   1460   959   387  1066     6582
           LAWR/H URBAN   2661    160   1028   774   373   611     5607
                 SM.URBN   341      0    277   132    76    92      918

                 URB TOT  4020   1852   2765  1865   836  1769    13107

FRANKLIN          URBAN      0      0      0     0     0     0        0
                 SM.URBN   209     54     86    88    49    76      562

                 URB TOT   209     54     86    88    49    76      562

HAMPDEN    SPRING URBAN   2159    178   2361  1517   573  1113     7901
                 SM.URBN     0      0      0     0     0     0        0

                 URB TOT  2159    178   2361  1517   573  1113     7901
                                                                      0
HAMPSHIRE  SPRING URBAN    270    117    413   462   115   202     1579
                 SM.URBN     0      0    351    94    40    92      577

                 URB TOT   270    117    764   556   155   294     2156
                                                                      0
MIDDLESEX  BOST   URBAN   6913   1985   4904  2192  1674  2837    20505
           LOWELL URBAN   1273   1367    759   833   484  1032     5748
                 SM.URBN     0      0      0     0     0     0        0

                 URB TOT  8186   3352   5663  3025  2158  3869    26253

NANTUCKET         URBAN      0      0      0     0     0     0        0
                                                                      0
NORFOLK    BOST   URBAN   4803    996   3341  1868   857  1853    13718
           PROVID URBAN    213      0    285    44    83    81      706
           BROCK  URBAN      0    111     26    55    14    25      231
                 SM.URBN     0      0      0     0     0     0        0
```

		URB TOT	5016	1107	3652	1967	954	1959	14655
									0
PLYMOUTH	BOST	URBAN	0	157	646	523	255	348	1929
	BROCK	URBAN	0	415	861	605	235	463	2579
	TAUNT	URBAN	241	5	340	41	46	13	686
		SM.URBN	0	127	375	100	80	121	803
		URB TOT	241	704	2222	1269	616	945	5997
SUFFOLK	BOST	URBAN	1531	1414	1957	858	280	827	6867
WORCESTER	BOST	URBAN	984	116	232	198	84	124	1738
	WORC	URBAN	2854	596	2279	771	273	664	7437
	FITC/L	URBAN	48	406	481	131	184	137	1387
	PROV	URBAN	0	0	1	56	13	20	90
		SM.URBN	0	196	480	304	184	263	1427
		URB TOT	3886	1314	3473	1460	738	1208	12079
			=====	=====	=====	=====	=====	=====	======
STATE			28418	12220	25692	14549	7881	14378	103138
									103138

APPENDIX

The Commonwealth of Massachusetts
Executive Office of Transportation and Construction
Ten Park Plaza, Boston, MA 02116-3969

William F. Weld
Governor

Argeo Paul Cellucci
Lieutenant Governor

James J. Kerasiotes
Secretary

September 17, 1993

Ms. Laurel J. Carlson
Deputy Director
Division of Air Quality Control
Department of Environmental Protection
One Winter Street
Boston, MA 02108

Dear Ms. Carlson:

In response to your letter of August 12th regarding EPA comments on the transportation element of the On-Road Mobile Source section of the 1990 Base Year Emissions Inventory, we have examined the EPA comments. Our response to each of the EPA numbered comments is provided below:

#13 - Documentation of VMT Estimation Procedures

VMT estimates supplied by MHD to DEP in March 1992 were based on HPMS VMT estimates for individual Federal-Aid Urbanized Areas, collective Small Urban Areas, and collective Rural areas within the Commonwealth. HPMS sampling procedures are designed to produce a statistically significant estimate of VMT for each of these areas. DEP desired VMT by county, so the HPMS VMT estimates were apportioned by county and highway functional classification in proportion to roadway mileage by urban versus rural area within each county.

We are aware of the FHWA request to document our Traffic Monitoring Program procedures in detail, however that documentation effort has not yet been performed. This work task is included in our 1993 SPR (State Planning and Research) work program with FHWA. The HPMS sample-based procedures, however, follow those specified in the HPMS Field Manual and Traffic Monitoring Guide.

VMT estimates on functional classification Local roadways were not developed using a count-based methodology. The estimating procedures used were developed in 1990 and were used

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beginning with our 1989 HPMS submission. These procedures are described in a letter dated June 25, 1990 to the FHWA Division Office transmitting our 1989 HPMS submission. The following material is excerpted from an attachment to that letter:

DVMT on Functional Class Local Roadways

A new procedure was used for estimating travel on functional class Local roadways for this submission. This procedure was developed with the assistance of the FHWA Division office. The TMG does not require a counting effort on functional class Local roadways, so an entirely different method was necessary, and although the procedure that was developed is not a highly scientific one, it is felt to be the best that could be done under the circumstances.

Traffic count data on relatively low-volume roadways was first obtained from Regional Planning Agencies. The locations of these ADT's were then checked to identify counts that had been made on functional class Local roadways. The appropriate section lengths were then obtained from the Road Inventory file, enabling derivation of "sample" mileage and "sample" DVMT. This was attempted for each Urbanized Area, collective Small Urban and Rural areas. Expansion factors were then calculated and estimates were developed for DVMT for each area. These estimates were then evaluated by comparing average DVMT per mile (i.e. average ADT) for each area. In several Urbanized areas there were an insufficient number of samples, so DVMT estimates were developed based on a DVMT per mile ratio. Also, the calculated DVMT estimates for collective Small Urban and Rural areas seemed too high when they were evaluated. This may have been due to the samples not being sufficiently representative of the population. In such cases, a DVMT per mile figure was used to develop the estimated functional class Local DVMT for these areas.

Attached is a copy of the letter and accompanying report we received from FHWA on Sept. 6, 1990, following an FHWA review of the 1990 Interstate DVMT figures from our 1990 HPMS submission.

#14 - VMT by Vehicle Classification

EPA has requested that Massachusetts develop state specifi VMT for each vehicle class instead of using default values from MOBILE5. Estimates of the proportion of VMT by each of 13 FHWA vehicle classification categories are made in the annual "Travel Activity by Vehicle Type and Functional System" areawide form, which is a component of our annual HPMS submission. These estimates are made from the MHD vehicle classification count program, which attempts to obtain 48 hour vehicle classification counts at approximately 100 sites per year on arterial and collector highways.

Copies of printouts of these areawide forms for 1990, 1991 and 1992 are attached. Due to the relatively low number of counts per year in each of the functional classification categories, a three year weighted average (based on the number of count sites each year) would yield a better estimate of VMT by vehicle type. Attached is a copy of a fourth printout that apportions 1990 DVMT in such a manner.

#16 - Documentation of Vehicle Speeds by Functional System and County

I have referred EPA's comments on this topic to Charles Sterling, State Traffic Engineer, for further documentation and investigation of this subject. We have met with Mr. Sterling to discuss this subject in some detail. The original speed data were originally assembled under Mr. Sterling's direction, but due to very severe time constraints this work effort relied primarily on previously-existing data as opposed to the collection of a great deal of additional new field data. We will forward Mr. Sterling's response to you when we receive it. In the meantime, Mr. Sterling can be reached at 973-7310 if you have any specific questions.

I hope the above information is sufficient for you to prepare at least a partial response to EPA's comments. If I can provide further information, please feel free to contact me.

Very truly yours,

Daniel F. Beagan
Director
Bureau of Transportation
Planning and Development

RRC/pc
Attachments

cc: VS
KSM
CFS
RRC
PAH

754F

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION ONE

TRANSPORTATION SYSTEMS CENTER
55 BROADWAY, 10TH FLOOR
CAMBRIDGE, MASSACHUSETTS 02142

IN REPLY REFER TO:

MASSACHUSETTS - 4R Review

HPP-MA

September 6, 1990

Mr. Michael L. Burke, P. E.
Director BTP&D - Room 4150
Ten Park Plaza
Boston, MA 02116 - 3973

Dear Mr. Burke:

Our review of the Interstate travel data reported in the June 1990 HPMS submission is documented in the attached report which is being forwarded for your information.

On the basis of the findings documented in the report, we have recommended that the Interstate travel data be accepted for use in determining the I-4R apportionment.

Sincerely Yours,

Anthony J. Fusco
Division Administrator

By: Edwin P. Holahan, Assistant
Division Administrator

Attachment

MASSACHUSETTES - REVIEW OF INTERSTATE TRAVEL DATA

By

EDWARD L. SILVA

ASSISTANT TRANSP. PLANNER

AUGUST, 1990

AP C.3-36

Massachusetts - I-4R Review

We reviewed the following aspects of the state's program to determine the adequacy of their Interstate travel estimates:

1) We reviewed the makeup of the seasonal factors groups.
2) We checked the actual calculation of the seasonal factors.
3) We randomly checked several coverage stations to see if the seasonal and axle correction factors had been properly applied.
4) We reviewed the procedure used to estimate AADT.
5) We reviewed the Interstate DVMT by route for reasonableness.
6) We examined the growth rates of Interstate Rural and Urban permanent stations as a cross-check on DVMT route growth.

MAKEUP OF SEASONAL FACTOR GROUPS

The State employed the following seasonal factor groups:

- West Interstate (I-91 Longmeadow, I-391 Chicopee, I-291 Springfield, I-91 Deerfield)
- I-495 Interstate (I-495 Marlboro, Bolton, Chelmsford, Mansfield, and I-95 Georgetown, Lynnfield)
- East Interstate (I-93 Boston,I-93 Andover, I-290 Worcester I-93 Medford, I-190 Worcester, I-95 Weston, I-95 Attleborro, I-195 Seekonk, I-95 Woburn, I-395 Webster, I-195 Dartmouth)
- I-84 Interstate (I-84 Sturbridge/Proximity)
- I-195 Interstate (I-195 Mattepoisett/Proximity)
- I-295 Interstate (Rhode Island Sta./Proximity)
- Urban Arterial and Collector Group(No Interstate sta.)

- Rural Collector Group (No Interstate sta.)
- Recreational Group (Includes I-495 Raynham, I-495 Havehill w/ no data)

(XXXX) Denotes the Interstate Permanent Stations assigned to each group.

With the exception of the addition of the I-295 Interstate Group, the factor group delineation used by the State is exactly as agreed upon by all parties. The State chose to add the I-295 Group as a matter of convenience and we see no problem with this. To makeup this group they had to take information from a permanent station just across the state line in Rhode Island.

CHECK OF THE CALCULATION OF SEASONAL FACTORS

The actual seasonal factors used by the State are tabulated below.

1989 SEASONAL FACTORS

1989 FACTOR GROUP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
GROUP 1 - WEST INTERSTATE	1.03	1.00	0.97	0.97	0.95	0.92	0.93	0.90	0.93	0.94	0.98	0.97
GROUP 2 - RURAL COLLECTOR	1.17	1.17	1.09	1.03	0.95	0.92	0.89	0.89	0.96	0.97	1.06	1.09
GROUP 3 - RECREATIONAL	1.37	1.38	1.25	1.13	0.99	0.89	0.72	0.73	0.94	1.03	1.15	1.17
GROUP 4 - I-495 INTERSTATE	1.15	1.12	1.05	1.02	0.95	0.88	0.84	0.81	0.87	0.93	0.99	1.02
GROUP 5 - EAST INTERSTATE	1.03	1.03	0.97	0.94	0.94	0.90	0.92	0.88	0.91	0.93	0.96	0.95
GROUP 6 - URBAN ARTERIALS, COLLECTORS AND RURAL ARTERIALS	1.05	1.04	0.97	0.93	0.93	0.91	0.94	0.90	0.93	0.95	0.98	0.98
GROUP 7 - I-84 PROXIMITY (STA.17)	1.33	1.40	1.19	1.07	1.04	1.04	0.95	0.93	1.00	1.02	1.07	0.99
GROUP 8 - I-295 PROXIMITY (RI STA.)	1.08	0.89	0.90	0.90	0.92	0.92	0.94	0.95	0.80	0.83	0.86	0.82
GROUP 9 - I-195 PROXIMITY (STA.7)	1.17	1.18	1.09	1.00	0.96	0.88	0.83	0.77	0.88	0.97	1.04	1.06

These factors were calculated independently of those contained in the Regional Office Report of April 26, 1990 (Attachment 7). A comparison of the two sets of factors will show that they are identical, thus confirming the accuracy of the State's factors.

RANDOM CHECK OF COVERAGE STATIONS FOR PROPER APPLICATION OF SEASONAL AND AXLE CORRECTION FACTORS

Seventeen Coverage Stations were randomly selected to determine if the adjustment factors had been properly applied. The coverage stations checked were:

.Sta. 7183 / I-195 Marion
.Sta. 6107 / I-195 Westport
.Sta. 2032 / I-91 Whately
.Sta. 2163 / I-391 Chicopee
.Sta. 2246 / I-291 Springfield
.Sta. 3289 / I-395 Webster
.Sta. 3293 / I-190 W. Boylston
.Sta. 3318 / I-290 Northborough
.Sta. 3321 / I-495 MIlford
.Sta. 3921 / I-84 Sturbridge
.Sta. 4049 / I-95 Woburn
.Sta. 4095 / I-93 Wilmington
.Sta. 5084 / I-95 Boxford
.Sta. 5122 / I-495 Haverhill
.Sta. 6096 / I-95 Canton
.Sta. 6640 / I-295 Attleboro
.Sta. 7023 / I-495 Middleboro

The random selection of the above stations was designed to assure that each Interstate route was represented at least once in the sample. In those instances where the entire route belonged to one factor group, the route is represented only once in the sample. In those instances where a route was assigned to more than one factor group, the route is represented more than once in the sample, accordingly.

After checking the source records for each of the above coverage stations, we concluded that both the seasonal and the axle correction factors had been properly applied.

REVIEW OF PROCEDURES FOR ESTIMATING AADT'S

Where actual counts did not exist, growth factors were developed using the same method as last year for each functional class, with the exception of the Interstate. For those sections on the Interstate which did not have a current count the State developed estimates of AADT'S based on historic data and interpolation between adjoining sections where current count data existed. This is a procedure which the State had used until last year when it was decided to use the growth factor procedure recommended in the TMG. This proved to be an unsuccessful effort and thus the reason for returning to the traditional procedure.

We checked the application of this procedure on I-95, I-290, I-395, and I-190 and found that the State had made a good faith effort to apply the procedure. The problems we encountered are that, in some instances, there was not enough count history to work with, and wide gaps between actual counts could still be found. In those instances, the job of estimating AADT'S became very difficult. As the State's traffic count program evolves, however, everyone expects this situation to improve.

ANALYSIS OF INTERSTATE DVMT'S BY ROUTE

A plot of Interstate DVMT by route can be found below. The plot shows the trends in DVMT between 1985 and 1989. Of particular interest to us were the columns labeled "Average Change 1986-1988" and " % Change 1988-1989".

INTERSTATE DVMT BY ROUTE - SHOWING PAST HPMS SUBMISSIONS AND 1989 DVMT FROM
AADT'S RECEIVED FROM TRAFFIC COUNTING SECTION ON 5/25/90

AFTER REVISIONS MADE TO INTERSTATE AADT'S ON 81 HPMS SECTIONS ON 6/12/90

Route	1985 DVMT	1986 DVMT	% Change 1985-86	1987 DVMT	% Change 1986-87	Average Change 1985-87	1988 DVMT (Second Submission)	% Change 1987-88	✓ Average Change 1986-1988	1989 DVMT AFTER AADT's REVISED 6/11	✓ % Char 1988-1
I-84	229,597.00	291,379.00	22.6%	271,301.00	-3.6%	9.08%	278,718.54	2.7%	-0.5%	298,685.41	7
I-90	4,922,225.84	5,297,693.92	7.6%	5,596,462.00	5.6%	6.85%	5,901,584.93	5.5%	5.7%	6,001,722.61	1
I-91	1,553,303.00	1,676,607.50	7.9%	1,745,381.00	4.1%	6.18%	1,871,998.60	7.3%	5.8%	1,947,349.87	4
I-93	5,491,816.50	5,381,368.00	-2.0%	5,753,539.10	6.9%	2.38%	6,586,552.36	14.5%	11.2%	6,345,206.72	-3
I-95	6,302,017.00	7,635,639.45	21.2%	7,895,124.30	3.4%	12.64%	8,635,808.18	10.1%	6.9%	8,630,818.49	-0
I-190	299,720.00	291,693.00	0.7%	340,438.00	16.7%	8.75%	430,325.61	26.4%	23.8%	483,211.77	1
I-195	1,348,375.50	1,431,851.00	6.2%	1,547,532.60	8.1%	7.39%	1,650,807.86	6.7%	7.6%	1,765,203.60	6
I-290	953,935.50	1,041,405.50	9.2%	1,091,001.70	4.8%	7.18%	1,233,666.41	13.1%	9.2%	1,233,462.19	-0
I-291	272,056.00	290,719.00	3.2%	299,007.00	3.0%	3.12%	320,635.36	10.9%	7.1%	336,090.24	4
I-295	46,929.50	50,243.00	7.1%	91,791.00	82.7%	47.80%	94,523.58	3.0%	44.1%	81,853.32	-1
I-391	110,150.00	117,110.00	6.3%	124,750.00	6.5%	6.63%	130,999.13	5.0%	5.9%	136,449.19	4
I-395	206,859.50	262,649.00	27.0%	277,272.20	5.6%	17.02%	322,829.08	16.4%	11.5%	345,406.74	6
I-495	4,906,291.20	5,038,852.00	2.7%	6,167,344.30	22.4%	12.85%	6,702,242.64	8.7%	16.5%	6,919,244.42	[illegible]
	26,633,276.54	28,787,260.37	8.1%	31,191,004.20	8.4%	8.56%	34,220,692.28	9.7%	9.4%	34,524,704.57	[illegible]

I-395 175,094.50 (from 1985 DRP)

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In looking at the two columns of interest one can see that on every route, with one exception, the percent change in DVMT between 1988 and 1989 was lower than the average change in DVMT between 1986 and 1988. One can also see from the table that the total change in DVMT between 1988 and 1989 was much lower than usual (only +0.89%). One logical explanation for these lower than usual numbers is the downturn in the State's economy.

EXAMINATION OF GROWTH RATES FOR INTERSTATE RURAL AND URBAN PERMANENT STATIONS

The tables below shows the growth rates for Interstate rural and urban permanent stations.

GROWTH RATES FOR INTERSTATE RURAL AND URBAN PERMANENT STATIONS

RURAL INTERSTATE

Station	1985 AADT	1986 AADT	% Change 1985-86	1987 AADT	% Change 1986-87	1988 AADT	% Change 1987-88	Average Change 1985-88	1989 AADT	% Change 1988-89
6	20,498	21,922	6.95%	23,404	6.76%	-			24,508	
7	20,659	23,251	12.55%	25,548	9.88%	26,750	4.70%	9.93%	26,516	-0.87%
9	49,939	52,504	5.14%	59,640	13.59%	64,950	8.90%	10.02%	67,903	4.55%
Total	70,598 (excl. Sta. 6)	97,677	7.22%	85,188 (excl. Sta. 6)	-12.79%	91,700 (excl. Sta. 6)	7.64% (excl. Sta. 6)	9.96%	94,419 (excl. Sta. 6)	2.97%

URBAN INTERSTATE

Station	1985 AADT	1986 AADT	% Change 1985-86	1987 AADT	% Change 1986-87	1988 AADT	% Change 1987-88	Average Change 1985-88	1989 AADT	% Change 1988-89
10	24,258	26,941	11.06%	36,605	35.87%	40,800	11.46%	22.73%	44,350	8.70%
15	40,033	45,405	13.42%	45,861	1.00%	49,400	7.72%	7.80%	50,489	2.20%
22	77,974	82,229	5.46%	88,831	8.03%	94,800	6.72%	7.19%	96,573	1.87%
30	13,974	13,129	-6.05%	16,103	22.65%	16,500	2.47%	6.03%	17,218	4.35%
33	27,898	23,562	-15.54%	32,569	38.23%	33,950	4.24%	7.23%	34,866	2.70%
60	46,250	51,314	10.95%	51,942	1.22%	55,950	7.72%	6.99%	57,241	2.31%
316	20,022	22,033	10.04%	25,848	17.31%	27,050	4.65%	11.70%	28,513	5.41%
601	33,369	35,294	5.77%	38,547	9.22%	40,550	5.20%	7.17%	42,553	4.94%
650	52,744	46,925	-11.03%	56,833	21.11%	64,850	14.11%	7.65%	68,216	5.19%
Total	336,522	346,831	3.06%	393,139	13.35%	423,850	7.81%	8.65%	440,019	3.81%

Once again the percent change between 1988 and 89 is considerably lower than the average change between 1985 and 88 for both the rural and the urban permanent stations. One can also see that the growth in traffic between 1988 and 89 was much lower than the growth between 1987 and 88. These are further indicators that the growth in traffic in 1989 was much lower than usual.

CONCLUSION

Through this review we have confirmed that, in developing its estimates of Interstate travel, the State employed the suggestions offered by FHWA in April 1990. Furthermore, an analysis of the results shows that the estimates of travel reported by the State appear to be reasonable.

Travel Activity by Vehicle Type and Functional System - Part 1

Functional System		Year	RU	FS	Motor cycle	Passenger Car	Other 2-Axle 4-Tire Vehicle	Buses	Single Unit Trucks 2-Axle 6-Tire	Single Unit Trucks 3-Axle	Single Unit Trucks 4 or More Axle	Single Trailer Trucks 4 or Less Axle	Single Trailer Trucks 5-Axle	Single Trailer Trucks 6 or More Axle	Multi Trailer Trucks 5 or Less Axle	Multi Trailer Trucks 6-Axle	Multi Trailer Trucks 7 or More Axle	TOTAL FOR LINE	No. of Sta
Rural	Intrstate	90	1	01	0.6	75.0	8.8	0.7	2.2	0.7	0.3	3.1	7.9	0.3	0.4	0.0	0.0	100.0	7
	OthPrnArt	90	1	02	0.2	84.2	10.9	0.4	1.9	0.4	0.1	0.6	1.2	0.0	0.0	0.0	0.1	100.0	2
	Minor Art	90	1	06	0.6	84.8	11.3	0.2	1.1	0.4	0.1	0.5	0.8	0.1	0.0	0.0	0.1	100.0	4
	MajorColl	90	1	07	0.5	75.5	19.3	0.8	1.8	0.7	0.0	0.5	0.9	0.0	0.0	0.0	0.0	100.0	5
	MinorColl	90	1	08	2.4	78.0	14.6	0.0	0.0	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	100.0	1
	Local	90	1	09	2.4	78.0	14.6	0.0	0.0	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	100.0	1
Urban	Intrstate	90	2	11	0.6	81.1	10.8	0.4	1.6	0.6	0.1	1.4	3.2	0.1	0.1	0.0	0.0	100.0	16
	OthFwyExy	90	2	12	0.4	86.5	8.9	0.3	1.4	0.4	0.0	0.7	1.3	0.1	0.0	0.0	0.0	100.0	10
	OthPrnArt	90	2	14	0.5	86.6	9.5	0.3	1.0	0.6	0.2	0.5	0.7	0.1	0.0	0.0	0.0	100.0	26
	Minor Art	90	2	16	0.4	85.3	11.5	0.5	1.1	0.5	0.1	0.3	0.2	0.1	0.0	0.0	0.0	100.0	15
	Collector	90	2	17	0.5	85.7	11.6	0.3	0.7	0.7	0.0	0.2	0.3	0.0	0.0	0.0	0.0	100.0	6
	Local	90	2	19	0.5	85.7	11.6	0.3	0.7	0.7	0.0	0.2	0.3	0.0	0.0	0.0	0.0	100.0	6

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e es	Trailer xle	Trucks 6 or More Axle	Multi 5 or Less Axle	Trailer 6-Axle	Trucks 7 or More Axle	TOTAL FOR LINE	No. of Sta
.1	7.9	0.3	0.4	0.0	0.0	100.0	7
.5	1.2	0.0	0.0	0.0	0.1	100.0	2
.5	3.3	0.1	0.0	0.0	0.1	100.0	4
.5	0.9	0.0	0.0	0.0	0.0	100.0	5
.0	0.0	0.0	0.0	0.0	0.0	100.0	1
.0	0.0	0.0	0.0	0.0	0.0	100.0	1
.4	3.2	0.1	0.1	0.0	0.0	100.0	16
.7	1.3	0.1	0.0	0.0	0.0	100.0	10
.5	0.7	0.1	0.0	0.0	0.0	100.0	26
.3	0.2	0.1	0.0	0.0	0.0	100.0	15
.2	0.3	0.0	0.0	0.0	0.0	100.0	6
.2	0.3	0.0	0.0	0.0	0.0	100.0	6

Is Vehicle Classification Data Reported On Part 1 Representative Of All Hours Of The Day, Days Of The Week, And Seasons Of The Year?

___ Yes X No

If No, Please Answer The Following:

1. Vehicle Classification Data On Part 1 Are Representative Of Data Normally Collected During The Hours Of:

12 AM To 12 AM

2. Vehicle Classification Data On Part 1 Are Representative Of Data Normally Collected On The Following Days During The Following Months (Check Those That Are Appropriate):

___	Sunday			___	January	X	May	X	September
X	Monday	X	Thursday	___	February	X	June	X	October
X	Tuesday	X	Friday	___	March	X	July	X	November
X	Wednesday	___	Saturday	X	April	X	August	___	December

Vehicle Type	Reported Under Which Vehicle Category On Part 1
2-Axle, 4-Tire Trucks Without A Trailer	3
2-Axle, 4-Tire Trucks With A Trailer	
2-Axle, 6-Tire Pickup Trucks Without A Trailer	5
2-Axle, 6-Tire Pickup Trucks With A Trailer	
Other Single-Unit Trucks With Semi-Trailers	
Other Single-Unit Trucks With Full-Trailers	

Comments

Rural Local - Used same data as was obtained from Rural Minor Collectors.

Urban Local - Used same data as was obtained from Urban Collectors.

Rcd 11/4/93
K.S

INTEROFFICE MEMORANDUM

TO: Michael J. Costa, Manager, IVHS/Operations

FROM: Rick Wilson

DATE: October 19, 1993

SUBJECT: SPEED DATA FOR D.E.P. STUDY

All of the speed data submitted for the D.E.P.'s Air Quality Study was obtained from our Speed Zoning files or collected at the actual locations if relatively recent data were not available on file.

The method of data collection used was radar observations of at least 100 vehicles at each location, as used in speed zoning studies. One of the techniques employed when taking radar observations vital to compiling accurate data for a speed study, is that the "lead" car in a platoon is the only vehicle used in the study. In other words, only the motorist choosing his or her own speed is documented in a speed study, and other following directly behind such "lead" cars are eliminated. Also, speeds are collected on off-peak hours under ideal conditions. (Clear; Dry Roadways, etc...)

I hope this information is of use to you, and if you have any further questions, please advise.

RFW/ad

TABLE 1 SPEEDS FOR MOBILE SOURCE INVENTORY

10/19/93

(50th Percentile)

	CLASS:											
COUNTY:	U1	U2	U3	U4	U5	U6	R1	R2	R3	R4	R5	R6
BERKSHIRE	--	48	39	40	39	20	60	53	38	40	33	29
FRANKLIN	58	48	36	32	34	33	58	48	44	43	35	30
HAMPSHIRE	59	46	35	32	28	20	59	46	43	33	39	37
HAMPDEN	59	44	42	39	37	24	60	--	42	37	36	29
WORCESTER	54	57	45	39	40	28	59	43	53	40	35	25
MIDDLESEX	60	54	44	44	25	28	60	42	43	39	33	34
ESSEX	60	48	42	33	36	25	59	50	50	40	33	20
SUFFOLK	57	43	34	30	31	29	--	--	--	--	--	--
NORFOLK	60	51	39	36	32	29	60	--	52	39	39	31
BRISTOL	59	50	42	32	33	31	--	58	40	39	34	36
PLYMOUTH	60	60	44	40	29	28	60	58	51	48	31	27
BARNSTABLE	--	60	40	35	37	27	--	50	42	40	37	23
DUKES	--	--	--	--	--	--	--	--	34	39	32	27
NANTUCKET	--	--	--	--	--	--	--	--	--	35	40	23

The Commonwealth of Massachusetts
Executive Office of Transportation & Construction
Office of the Secretary

Aug 13 '93

TO: Files

FROM: Michelle B. Hanley MBH

DATE: May 4, 1993

SUBJECT: Statewide Transportation Inventory Submission

In February of 1992, Statewide Planning staff began work on the submission of the Massachusetts Statewide Inventory to DEP. 1990 Daily Vehicles Miles Traveled (DVMT) stratified by county and functional roadway class by area type (urban, small urban and rural), seasonal DVMT variation, speed data by county and functional class, and projected DVMT to 1999 attainment year were each developed.

The source for the base year mileage and DVMT was the Highway Performance Monitoring System (HPMS). The 1990 roadway mileage was taken from a HPMS database with information broken down by roadway class, county and area type. This information was allocated into a format compatible with EPA guidelines. Seasonal DVMT variation was developed based on average weekday volumes recorded at MHD permanent count stations. Average weekday hourly volumes were calculated for a typical 24 hour period in January and July. Statewide speed data, by county and functional class, was also tabulated by the Traffic Operations Section.

A trend line growth rate based on an ordinary least squares linear regression extrapolation of HPMS data from 1987-1990 was first used to make preliminary DVMT projections. However, Statewide Planning staff determined that many of the individual correlation coefficients that were calculated were below acceptable levels. Pre-1987 HPMS data, in some cases back to 1980, was then used to form a "best fit" projection to 1999. With this method, a 4% annual increase in DVMT to 1999 was developed and submitted to DEP on April 1, 1992.

Most reviewers agreed that 4% annual growth was an aggressive forecast for the State. However, Statewide Planning staff felt that not using an expanded data base (ie more years) would result in an even higher annual growth rate. In February of 1993, a power function was developed for each roadway class by area type again using data from 1980 through 1990. This methodology yielded a 2.7% annual growth in DVMT and was presented to DEP and EPA for review.

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EPA's formal response to DEP in late March of 1993 outlined the requirement for using the methods presented in the Section 187 VMT Forecasting and Tracking Guidance (January, 1992). An ordinary least squares linear regression extrapolation of HPMS data for the latest six-year period is the recommended methodology.

In April of 1993 the EPA methodology was used to develop revised DVMT forecasts. This was done without considering the limitations of the data or the correlation coefficients of the individual regressions. From this analysis it was determined that using varying years of data skewed the individual regressions to an overall higher growth than a single regression on the total. Using an ordinary least squares linear regression soley based on 1986 to 1991 data, in accordance with the EPA guidance, the revised DVMT projections yield a 2.4% annual growth to the 1999 attainment year.

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APPENDIX C.4

MOBILE5a INPUT/OUTPUT FILES

CO - WINTER

```
  U1 URBAN INTERSTATE -CO WINTER MOBILE5a INPUTS
1           PROMPT - vertical flag input, no prompting
            MOBILE 5a  CO  1990  Base  Year  Emissions  Inv.  10/12/93
(w/state age dist. 1990)
1           TAMFLG - default tampering rates

1           SPDFLG - one speed per scenario
3           VMFLAG - -        vehicle mix - state

3          MYMRFG - local registration and default mileage accrual
rates
1           NEWFLG - default exhaust emission rates

2           IMFLAG - include I/M program

1           ALHFLG - no additional correction factor inputs

1           ATPFLG - no anti-tampering program

1            RLFLAG - Stage II vapor recovery program not in Base
Year
2          LOCFLG - read in local area parameters one time for all
scenarios
1           TEMFLG - use max/min temps
4           OUTFMT - 80 column descriptive format

4                    PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2           IDLFLG - print idle emissions results

3             NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4           HCFLAG - tot & comps HC

.800.071.036.018.011.001.057.006
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
```

```
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1       .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
```

```
1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
```

AP C 4-1-3

```
   U1 URBAN INTERSTATE
1             MOBILE 5a CO WINTER 1990 Base Year Emissions Inv.
10/12/93 (w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0     Start year (January 1):                 1983
      Pre-1981 MYR stringency rate:            12%
      First model year covered:               1976
      Last model year covered:                2020
      Waiver rate (pre-1981):                  1.%
      Waiver rate (1981 and newer):            1.%
      Compliance Rate:                        80.%
      Inspection type:                          Computerized Test and
Repair
      Inspection frequency                    Annual
      Vehicle types covered:                  LDGV - Yes
                                             LDGT1 - Yes
                                             LDGT2 - Yes
                                              HDGV - No
      1981 & later MYR test type:             Idle
      Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                         Minimum Temp: 35. (F)   Maximum Temp: 45. (F)
                         Period 1 RVP: 13.5        Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_______________________________________________________________

________________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                     Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix:  0.800  0.071  0.036         0.018  0.011  0.001  0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.76  24.81   1.43   2.01   6.35
26.75  18.47
 Exhst  HC: 16.35  17.16  20.45  18.26  18.56   1.43   2.01   6.35
26.05  15.90
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
```

AP C.4-1-4

```
 Exhst  CO: 18.95  21.09  22.49  21.56  43.85   0.77   0.88   6.18
12.99  18.69
 Exhst NOX:  2.72   3.12   3.38   3.21   8.08   1.79   2.07  22.22
 1.55   3.96
U   1           I    N    T    E    R    S    T    A    T    E
_________________________________________________________________
__________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 54.0   54.0   54.0          54.0   54.0   54.0   54.0
 54.0
   VMT Mix:  0.800  0.071  0.036         0.018  0.011  0.001  0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.67   2.11   2.39   2.20   2.54   0.30   0.43   1.35
 3.36   1.72
 Exhst  HC:  1.29   1.63   1.80   1.69   1.41   0.30   0.43   1.35
 2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.20
 Runing HC:  0.03   0.02   0.03   0.03   0.07
        0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.56  44.72   0.78   0.89   6.24
12.99  18.71
 Exhst NOX:  2.82   3.23   3.50   3.32   8.14   1.84   2.13  22.85
 1.60   4.09

_________________________________________________________________
__________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
```

AT C-4-1-5

```
 Refuel HC:  0.21    0.27    0.27    0.27    0.45    U1 INTERSTATE
                             0.20
 Runing HC:  0.02    0.02    0.03    0.03    0.06
        0.02
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
 0.00   0.00
 Exhst  CO: 22.23   25.31   27.11   25.92   46.82    0.80    0.91    6.39
16.12  21.87
 Exhst NOX:  3.02    3.45    3.74    3.55    8.25    1.95    2.26   24.27
 1.68   4.36

________________________________________________________________________

_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low             Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+          ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 57.0    57.0    57.0            57.0    57.0    57.0    57.0
 57.0
   VMT Mix:  0.800  0.071  0.036            0.018   0.011   0.001   0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.84    2.32    2.63    2.43    2.51    0.30    0.42    1.32
 3.74   1.88
 Exhst  HC:  1.46    1.85    2.05    1.92    1.39    0.30    0.42    1.32
 3.03   1.49
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
 0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.20
 Runing HC:  0.02    0.02    0.03    0.02    0.06
        0.02
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
 0.00   0.00
 Exhst  CO: 25.51   29.53   31.72   30.27   48.07    0.81    0.92    6.49
19.25  25.01
 Exhst NOX:  3.11    3.55    3.86    3.66    8.30    2.02    2.33   25.07
 1.73   4.50

________________________________________________________________________

_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
```

AP 6.4-1-6

```
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______U1 INTERSTATE
 Veh. Spd.: 58.0   58.0   58.0          58.0   58.0   58.0   58.0
 58.0
   VMT Mix:  0.800  0.071  0.036         0.018  0.011  0.001  0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.92   2.43   2.76   2.54   2.51   0.30   0.42   1.31
 3.94   1.96
 Exhst  HC:  1.54   1.96   2.18   2.03   1.38   0.30   0.42   1.31
 3.23   1.57
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.20
 Runing HC:  0.02   0.02   0.03   0.02   0.06
        0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 28.79  33.76  36.34  34.63  49.46   0.82   0.94   6.60
22.38  28.15
 Exhst NOX:  3.21   3.66   3.99   3.77   8.36   2.09   2.41  25.92
 1.77   4.64


_________________________________________________________________
_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 59.0   59.0   59.0          59.0   59.0   59.0   59.0
 59.0
   VMT Mix:  0.800  0.071  0.036         0.018  0.011  0.001  0.057
0.006
0Composite Emission Factors (Gm/Mile)
```

AP C-4-1-7

```
 VOC     HC:  2.00    2.54    2.88    2.66    2.51    0.29    0.42    1.31
 4.13    2.03
 Exhst   HC:  1.62    2.07    2.30    2.15    1.38    0.29    0.42    1.31
 3.42    1.65
 Evap.   HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:   0.21    0.27    0.27    0.27    0.45
         0.20
 Runing HC:   0.02    0.02    0.03    0.02    0.06
         0.02
 Rsting HC:   0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst   CO: 32.07   37.98   40.96   38.98   51.00    0.84    0.96    6.72
25.50   31.29
 Exhst NOX:   3.31    3.77    4.11    3.88    8.41    2.16    2.50   26.85
       1      .      8.      1               4      .        7        8
_____________________________________________________________________________
_______________  U1 INTERSTATE
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low          Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+          ______  ______  ______  ______  ______  ______  ______  ______

______  ______
 Veh. Spd.: 60.0    60.0    60.0            60.0    60.0    60.0    60.0
 60.0
   VMT Mix:  0.800  0.071  0.036           0.018   0.011   0.001   0.057
0.006
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  2.08    2.65    3.01    2.77    2.51    0.29    0.41    1.31
 4.32    2.11
 Exhst   HC:  1.70    2.18    2.43    2.26    1.39    0.29    0.41    1.31
 3.61    1.73
 Evap.   HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:   0.21    0.27    0.27    0.27    0.45
         0.20
 Runing HC:   0.02    0.02    0.03    0.02    0.06
         0.02
 Rsting HC:   0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst   CO: 35.36   42.20   45.57   43.34   52.71    0.85    0.98    6.86
28.63   34.44
 Exhst NOX:   3.41    3.88    4.23    4.00    8.47    2.24    2.59   27.85
 1.86    4.93
```

AP c·4-1-8 8

```
   U2 FREEWAYS & EXPRESSWAYS MOBILE5a INPUTS -CO WINTER
1            PROMPT - vertical flag input, no prompting
             MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dist. 1990)
1            TAMFLG - default tampering rates

1            SPDFLG - one speed per scenario
3            VMFLAG -          vehicle mix-state

3           MYMRFG - local registration and default mileage accrual
rates
1            NEWFLG - default exhaust emission rates

2            IMFLAG - include I/M program

1            ALHFLG - no additional correction factor inputs

1            ATPFLG - no anti-tampering program

1             RLFLAG - Stage II vapor recovery program not in Base
Year
2           LOCFLG - read in local area parameters one time for all
scenarios
1            TEMFLG - use max/min temps
4            OUTFMT - 80 column descriptive format

4                    PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2            IDLFLG - print idle emissions results

3              NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4            HCFLAG - tot & comps HC

.852.059.030.015.012.001.027.004
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
```

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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                           - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                             21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                           - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                  .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1        .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
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1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
```

```
     U2 FREEWAYS & EXPRESWAYS
1     MOBILE 5a  1990  CO WINTER OUTPUTS 10/12/93 (w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                 1983
     Pre-1981 MYR stringency rate:            12%
     First model year covered:               1976
     Last model year covered:                2020
     Waiver rate (pre-1981):                  1.%
     Waiver rate (1981 and newer):            1.%
     Compliance Rate:                        80.%
     Inspection type:                           Computerized Test and
Repair
     Inspection frequency                    Annual
     Vehicle types covered:                  LDGV - Yes
                                            LDGT1 - Yes
                                            LDGT2 - Yes
                                             HDGV - No
     1981 & later MYR test type:             Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)   Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5        Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0________________________________________________________________
________________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+
           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
  VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.76  24.81   1.43   2.01   6.35
26.75  18.78
 Exhst  HC: 16.35  17.16  20.45  18.27  18.56   1.43   2.01   6.35
26.05  16.13
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
```

AP C.4-2-4

```
U2 FREEWAYS & EXPRESSWAYS
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.82    2.24    2.54    2.34    2.90    0.35    0.50    1.57
3.51    1.86
 Exhst  HC:  1.41    1.75    1.94    1.81    1.73    0.35    0.50    1.57
2.80    1.45
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.05    0.04    0.05    0.04    0.11
         0.04
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 20.32   22.19   23.88   22.76   40.82    0.78    0.89    6.29
14.51   20.19
 Exhst NOX:  2.18    2.53    2.72    2.60    7.47    1.44    1.67   17.94
 1.29   2.71

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low             Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:    43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:    20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 43.0   43.0   43.0           43.0   43.0   43.0   43.0
 43.0
   VMT Mix:  0.852  0.059  0.030          0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.79    2.21    2.52    2.32    2.85    0.35    0.49    1.54
3.47    1.84
 Exhst  HC:  1.39    1.72    1.91    1.79    1.69    0.35    0.49    1.54
2.76    1.43
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.04    0.04    0.05    0.04    0.10
         0.04
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 20.05   21.97   23.61   22.52   40.64    0.78    0.88    6.22
14.19   19.93
```

ok

AP C-4-2-5

```
 Exhst NOX:  2.19   2.54   2.73   2.60   7.53   1.46   1.69  18.17
 1.29   2.72
F  R  E  E  W  A  Y  S     &     E  X  P  R  E  S  S  W  A  Y  S
____________________________________________________________________
___________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          _____  _____  _____  _____  _____  _____  _____  _____
_____  _____
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.77   2.19   2.49   2.29   2.81   0.34   0.48   1.51
 3.44   1.81
 Exhst  HC:  1.37   1.70   1.89   1.77   1.64   0.34   0.48   1.51
 2.73   1.40
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.04   0.03   0.05   0.04   0.10
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 19.81  21.76  23.35  22.30  40.54   0.77   0.88   6.17
13.91  19.70
 Exhst NOX:  2.20   2.55   2.74   2.61   7.58   1.48   1.71  18.42
 1.30   2.74

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

AP c.4-2-6

```
 MC   All Veh
+                   ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 45.0   45.0   45.0          45.0   45.0   45.0   45.0
 45.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.75   2.17   2.46   2.27   2.77   0.33   0.47   1.49
3.42   1.79
 Exhst  HC:  1.35   1.68   1.86   1.74   1.61   0.33   0.47   1.49
2.71   1.38
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
 0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
       0.21
 Runing HC:  0.04   0.03   0.04   0.04   0.10
       0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
 0.00   0.00
 Exhst  CO: 19.57  21.58  23.12  22.10  40.54   0.76   0.87   6.13
13.65  19.48
 Exhst NOX:  2.20   2.55   2.75   2.62   7.64   1.51   1.74  18.70
 1.31   2.75


_____________________________________________________________________
______
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude: 500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+                   ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 46.0   46.0   46.0          46.0   46.0   46.0   46.0
 46.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.72   2.15   2.44   2.25   2.73   0.33   0.47   1.47
 3.39   1.77
 Exhst  HC:  1.33   1.66   1.84   1.72   1.57   0.33   0.47   1.47
2.69   1.36
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
 0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
       0.21
 Runing HC:  0.04    0.03    0.04    0.04    0.09       U2 FREEW & EXP
                             0.04
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 19.35   21.40   22.89   21.91   40.62    0.76    0.87    6.09
13.41  19.28
 Exhst NOX:  2.21    2.56    2.76    2.63    7.69    1.53    1.77   19.01
 1.32   2.77

_________________________________________________________________________
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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 47.0   47.0   47.0          47.0   47.0   47.0   47.0
 47.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.70    2.13    2.42    2.23    2.70    0.33    0.46    1.45
3.37   1.75
 Exhst  HC:  1.31    1.65    1.82    1.70    1.54    0.33    0.46    1.45
2.67   1.34
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
 0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.03    0.03    0.04    0.03    0.09
        0.03
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
 0.00   0.00
 Exhst  CO: 19.15   21.24   22.69   21.73   40.80    0.76    0.86    6.07
13.19  19.08
 Exhst NOX:  2.22    2.57    2.77    2.64    7.75    1.56    1.80   19.36
 1.32   2.79

_________________________________________________________________________
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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
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AP C.4-2-8

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 U2 FREEW & EXP     I/M Program: Yes        Ambient Temp:   43.0 /
43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:    20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
OVeh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 48.0    48.0   48.0           48.0    48.0    48.0    48.0
 48.0
   VMT Mix:  0.852  0.059  0.030          0.015   0.012   0.001   0.027
0.004
OComposite Emission Factors (Gm/Mile)
 VOC    HC:  1.68    2.11   2.39    2.21   2.67    0.32    0.45    1.43
 3.36   1.73
 Exhst  HC:  1.29    1.63   1.80    1.69   1.51    0.32    0.45    1.43
 2.65   1.33
 Evap.  HC:  0.15    0.19   0.29    0.22   0.61
  0.71   0.16
 Refuel HC:  0.21    0.27   0.27    0.27   0.45
         0.21
 Runing HC:  0.03    0.03   0.04    0.03   0.09
         0.03
 Rsting HC:  0.00    0.00   0.00    0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95   21.09  22.49   21.56  41.07    0.76    0.86    6.06
12.99  18.90
 Exhst NOX:  2.23    2.58   2.78    2.65   7.81    1.59    1.84   19.74
 1.33   2.81

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OEmission factors are as of Jan. 1st of the indicated calendar
year.
OUser supplied veh registration distributions.
OCal. Year: 1990              Region: Low               Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:    20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
OVeh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 49.0    49.0   49.0           49.0    49.0    49.0    49.0
 49.0
   VMT Mix:  0.852  0.059  0.030          0.015   0.012   0.001   0.027
0.004
OComposite Emission Factors (Gm/Mile)
 VOC    HC:  1.68    2.11   2.39    2.21   2.64    0.32    0.45    1.41
 3.36   1.72
```

AP C-4-2-9

```
 Exhst  HC:  1.29    1.63    1.80    1.69    1.49    0.32    0.45    1.41
 2.65   1.32
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61                U2 FR & EX
          0.71    0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.03    0.03    0.04    0.03    0.08
        0.03
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
 0.00   0.00
 Exhst  CO: 18.95   21.09   22.49   21.56   41.42    0.76    0.86    6.07
12.99  18.91
 Exhst NOX:  2.33    2.69    2.90    2.76    7.86    1.62    1.88   20.15
 1.38   2.92

________________________________________________________________________

0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 50.0    50.0    50.0            50.0    50.0    50.0    50.0
 50.0
   VMT Mix:  0.852   0.059   0.030           0.015   0.012   0.001   0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68    2.11    2.39    2.20    2.61    0.31    0.44    1.40
 3.36   1.72
 Exhst  HC:  1.29    1.63    1.80    1.69    1.47    0.31    0.44    1.40
 2.65   1.32
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
 0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.03    0.03    0.04    0.03    0.08
        0.03
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
 0.00   0.00
✓Exhst  CO: 18.95   21.09   22.49   21.56   41.88    0.76    0.86    6.08
12.99  18.92
 Exhst NOX:  2.42    2.80    3.02    2.87    7.92    1.66    1.92   20.61
 1.42   3.02

________________________________________________________________________
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A7 C-4-2-10

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_______________U2
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 51.0   51.0   51.0          51.0   51.0   51.0   51.0
 51.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.20   2.59   0.31   0.44   1.38
3.36   1.72
 Exhst  HC:  1.29   1.63   1.80   1.69   1.45   0.31   0.44   1.38
2.65   1.32
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.04   0.03   0.08
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.56  42.43   0.76   0.87   6.10
12.99  18.92
 Exhst NOX:  2.52   2.90   3.14   2.98   7.97   1.70   1.96  21.10
 1.46   3.13

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_______________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 52.0   52.0   52.0          52.0   52.0   52.0   52.0
```

AP C-4-2-11

```
 Exhst  CO: 18.95  21.09  22.49  21.56  43.85   0.77   0.88   6.18
12.99  18.95
 Exhst NOX:  2.72   3.12   3.38   3.21   8.08   1.79   2.07  22.22
 1.55   3.35
                                                                U 2
____________________________________________________________________

_______________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                     Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                      Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 54.0   54.0   54.0          54.0   54.0   54.0   54.0
 54.0
   VMT Mix:  0.852  0.059  0.030        0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.67   2.11   2.39   2.20   2.54   0.30   0.43   1.35
 3.36   1.71
 Exhst  HC:  1.29   1.63   1.80   1.69   1.41   0.30   0.43   1.35
 2.65   1.32
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.02   0.03   0.03   0.07
        0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.56  44.72   0.78   0.89   6.24
12.99  18.96
 Exhst NOX:  2.82   3.23   3.50   3.32   8.14   1.84   2.13  22.85
 1.60   3.47

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                     Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
```

```
 Refuel HC:  0.21   0.27   0.27   0.27   0.45          U2
                    0.21
 Runing HC:  0.02   0.02   0.03   0.03   0.06
        0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
 0.00   0.00
 Exhst  CO: 22.23  25.31  27.11  25.92  46.82   0.80   0.91   6.39
16.12  22.19
 Exhst NOX:  3.02   3.45   3.74   3.55   8.25   1.95   2.26  24.27
 1.68   3.70
```

```
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 57.0   57.0   57.0          57.0   57.0   57.0   57.0
 57.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.84   2.32   2.63   2.43   2.51   0.30   0.42   1.32
 3.74   1.87
 Exhst  HC:  1.46   1.85   2.05   1.92   1.39   0.30   0.42   1.32
 3.03   1.48
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.02   0.02   0.03   0.02   0.06
        0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 25.51  29.53  31.72  30.27  48.07   0.81   0.92   6.49
19.25  25.41
 Exhst NOX:  3.11   3.55   3.86   3.66   8.30   2.02   2.33  25.07
 1.73   3.81
```

OK

```
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
```

AP C-4-2-13

```
 VOC    HC:  2.00    2.54    2.88    2.66    2.51    0.29    0.42    1.31
 4.13   2.04
 Exhst  HC:  1.62    2.07    2.30    2.15    1.38    0.29    0.42    1.31
 3.42   1.65
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
 0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.02    0.02    0.03    0.02    0.06
        0.02
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
 0.00   0.00
 Exhst  CO: 32.07   37.98   40.96   38.98   51.00    0.84    0.96    6.72
25.50  31.86
 Exhst NOX:  3.31    3.77    4.11    3.88    8.41    2.16    2.50   26.85
 1.81   4.05

______________________________________________________________________________

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh                      U2
+
              ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 60.0   60.0   60.0          60.0   60.0   60.0   60.0
 60.0
   VMT Mix:  0.852  0.059  0.030         0.015  0.012  0.001  0.027
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.08    2.65    3.01    2.77    2.51    0.29    0.41    1.31
 4.32   2.12
 Exhst  HC:  1.70    2.18    2.43    2.26    1.39    0.29    0.41    1.31
 3.61   1.73
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
 0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.02    0.02    0.03    0.02    0.06
        0.02
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
 0.00   0.00
 Exhst  CO: 35.36   42.20   45.57   43.34   52.71    0.85    0.98    6.86
28.63  35.08
 Exhst NOX:  3.41    3.88    4.23    4.00    8.47    2.24    2.59   27.85
 1.86   4.18
```

```
   U3 PRINCIPAL ARTERY  CO WINTER
1           PROMPT - vertical flag input, no prompting
            MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dist. 1990)
1           TAMFLG - default tampering rates

1           SPDFLG - one speed per scenario
3           VMFLAG -            vehicle mix -state

3          MYMRFG - local registration and default mileage accrual
rates
1           NEWFLG - default exhaust emission rates

2           IMFLAG - include I/M program

1           ALHFLG - no additional correction factor inputs

1           ATPFLG - no anti-tampering program

1            RLFLAG - Stage II vapor recovery program not in Base
Year
2          LOCFLG - read in local area parameters one time for all
scenarios
1           TEMFLG - use max/min temps
4           OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2           IDLFLG - print idle emissions results

3             NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4           HCFLAG - tot & comps HC

.854.062.032.013.012.001.021.005
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                           - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                             21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                           - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                  .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1        .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
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1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
```

```
   U3 PRINCIPAL ARTERY  CO WINTER
1             MOBILE 5a  1990 Base Year Emissions Inv. 10/12/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):              1983
     Pre-1981 MYR stringency rate:         12%
     First model year covered:            1976
     Last model year covered:             2020
     Waiver rate (pre-1981):               1.%
     Waiver rate (1981 and newer):         1.%
     Compliance Rate:                     80.%
     Inspection type:                        Computerized Test and
Repair
     Inspection frequency                 Annual
     Vehicle types covered:               LDGV - Yes
                                         LDGT1 - Yes
                                         LDGT2 - Yes
                                          HDGV - No
     1981 & later MYR test type:          Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)  Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5      Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________

________________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
 2.5
   VMT Mix:  0.854  0.062  0.032         0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.77  24.81   1.43   2.01   6.35
26.75  18.86
 Exhst  HC: 16.35  17.16  20.45  18.28  18.56   1.43   2.01   6.35
26.05  16.20
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
 0.71   0.16
```

```
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 34.0   34.0   34.0           34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.854  0.062  0.032          0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09   2.51   2.86   2.63   3.47   0.42   0.59   1.86
 3.96   2.14
 Exhst  HC:  1.66   2.01   2.25   2.09   2.27   0.42   0.59   1.86
 3.25   1.71
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.14
        0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 23.13  24.82  26.92  25.53  45.80   0.91   1.04   7.31
18.29  23.00
 Exhst NOX:  2.13   2.46   2.64   2.52   7.03   1.38   1.59  17.11
 1.21   2.53

____________________________________________________________________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
```

```
 _____ _____U3
 Veh. Spd.: 35.0   35.0   35.0          35.0   35.0   35.0   35.0
 35.0
   VMT Mix:  0.854  0.062  0.032         0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.05   2.47   2.81   2.58   3.38   0.41   0.58   1.82
 3.89   2.10
 Exhst  HC:  1.62   1.97   2.20   2.05   2.18   0.41   0.58   1.82
 3.18   1.67
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.06   0.04   0.06   0.05   0.13
         0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 22.69  24.40  26.44  25.09  44.80   0.89   1.01   7.13
17.68  22.57
 Exhst NOX:  2.14   2.47   2.66   2.53   7.09   1.38   1.59  17.12
 1.23   2.54

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:  43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          _____  _____  _____  _____  _____  _____  _____  _____
_____ _____
 Veh. Spd.: 36.0   36.0   36.0          36.0   36.0   36.0   36.0
 36.0
   VMT Mix:  0.854  0.062  0.032         0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.01   2.43   2.77   2.54   3.29   0.40   0.56   1.77
 3.82   2.06
 Exhst  HC:  1.59   1.93   2.15   2.01   2.10   0.40   0.56   1.77
 3.11   1.63
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.06   0.04   0.06   0.05   0.13
         0.06
 Rsting HC:  0.00    0.00    0.00    0.00    0.00                    U3
                     0.00    0.00
 Exhst  CO: 22.29   24.00   25.99   24.68   43.92    0.87    0.99    6.97
17.12  22.17
 Exhst NOX:  2.14    2.48    2.67    2.54    7.14    1.38    1.60   17.16
 1.24   2.55

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low             Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tàm. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+          ______  ______  ______  ______  ______  ______  ______  ______
_____  ______
 Veh. Spd.: 37.0    37.0    37.0            37.0    37.0    37.0    37.0
 37.0
   VMT Mix:  0.854   0.062   0.032           0.013   0.012   0.001   0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.97    2.39    2.72    2.50    3.21    0.39    0.55    1.73
 3.75   2.02
 Exhst  HC:  1.56    1.89    2.11    1.97    2.03    0.39    0.55    1.73
 3.04   1.60
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.06    0.04    0.05    0.05    0.12
        0.06
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 21.90   23.64   25.58   24.30   43.15    0.85    0.97    6.82
16.59  21.79
 Exhst NOX:  2.15    2.49    2.68    2.55    7.20    1.39    1.60   17.23
 1.25   2.55

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low             Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
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 Evap.  HC:  0.15    0.19    0.29    0.22    0.61                    U3
                      0.71    0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.05    0.04    0.05    0.04    0.12
        0.05
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 21.21   22.99   24.82   23.61   41.92    0.82    0.93    6.57
15.65  21.10
 Exhst NOX:  2.16    2.51    2.70    2.57    7.31    1.40    1.62   17.44
 1.26   2.57

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low             Altitude:  500.
Ft.
                         I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                    Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0    40.0   40.0           40.0    40.0    40.0    40.0
 40.0
   VMT Mix:  0.854  0.062  0.032          0.013   0.012   0.001   0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88    2.29    2.61    2.40    3.01    0.37    0.52    1.63
 3.59   1.92
 Exhst  HC:  1.47    1.80    2.00    1.87    1.83    0.37    0.52    1.63
 2.88   1.50
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.05    0.04    0.05    0.04    0.11
        0.05
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 20.89   22.70   24.49   23.31   41.46    0.80    0.92    6.46
15.23  20.79
 Exhst NOX:  2.17    2.51    2.71    2.58    7.36    1.42    1.64   17.58
 1.27   2.58

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
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0.005                                                    U3
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.82   2.24   2.54   2.34   2.90   0.35   0.50   1.57
 3.51   1.87
 Exhst  HC:  1.41   1.75   1.94   1.81   1.73   0.35   0.50   1.57
 2.80   1.45
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.05   0.04   0.05   0.04   0.11
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.32  22.19  23.88  22.76  40.82   0.78   0.89   6.29
14.51  20.24
 Exhst NOX:  2.18   2.53   2.72   2.60   7.47   1.44   1.67  17.94
 1.29   2.61

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 43.0   43.0   43.0          43.0   43.0   43.0   43.0
 43.0
   VMT Mix:  0.854  0.062  0.032        0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.79   2.21   2.52   2.32   2.85   0.35   0.49   1.54
 3.47   1.84
 Exhst  HC:  1.39   1.72   1.91   1.79   1.69   0.35   0.49   1.54
 2.76   1.43
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.04   0.04   0.05   0.04   0.10
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.05  21.97  23.61  22.53  40.64   0.78   0.88   6.22
14.19  19.98
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 Exhst NOX:  2.19   2.54   2.73   2.61   7.53   1.46   1.69  18.17
 1.29   2.62
                                                                 U3
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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           _____  _____  _____  _____  _____  _____  _____  _____
_____ _____
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.854  0.062  0.032         0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.77   2.19   2.49   2.29   2.81   0.34   0.48   1.51
 3.44   1.82
 Exhst  HC:  1.37   1.70   1.89   1.77   1.64   0.34   0.48   1.51
 2.73   1.41
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.04   0.03   0.05   0.04   0.10
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 19.81  21.76  23.35  22.30  40.54   0.77   0.88   6.17
13.91  19.75
 Exhst NOX:  2.20   2.55   2.74   2.61   7.58   1.48   1.71  18.42
 1.30   2.63

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

```
 MC   All Veh                                      U3
+                  ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 45.0    45.0   45.0           45.0   45.0   45.0   45.0
 45.0
   VMT Mix:  0.854  0.062  0.032          0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.75   2.17   2.46   2.27   2.77   0.33   0.47   1.49
 3.42   1.79
 Exhst  HC:  1.35   1.68   1.86   1.74   1.61   0.33   0.47   1.49
 2.71   1.38
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.04   0.03   0.04   0.04   0.10
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 19.57  21.58  23.12  22.10  40.54   0.76   0.87   6.13
13.65  19.53
 Exhst NOX:  2.20   2.55   2.75   2.62   7.64   1.51   1.74  18.70
 1.31   2.65


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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+                  ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 46.0    46.0   46.0           46.0   46.0   46.0   46.0
 46.0
   VMT Mix:  0.854  0.062  0.032          0.013  0.012  0.001  0.021
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.72   2.15   2.44   2.25   2.73   0.33   0.47   1.47
 3.39   1.77
 Exhst  HC:  1.33   1.66   1.84   1.72   1.57   0.33   0.47   1.47
 2.69   1.36
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
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```
    U4 MINOR ARTERY  INPUTS CO WINTER
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dist. 1990)
1          TAMFLG -           tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG - default vehicle mix-State

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.840.076.039.013.012.001.015.004
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                         - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                              21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                         - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1       .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
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1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
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App C.4-w-3

```
   U4 MINOR ARTERY CO WINTER OUTPUTS
1            MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                1983
     Pre-1981 MYR stringency rate:           12%
     First model year covered:              1976
     Last model year covered:               2020
     Waiver rate (pre-1981):                 1.%
     Waiver rate (1981 and newer):           1.%
     Compliance Rate:                       80.%
     Inspection type:                          Computerized Test and
Repair
     Inspection frequency                   Annual
     Vehicle types covered:                 LDGV - Yes
                                           LDGT1 - Yes
                                           LDGT2 - Yes
                                            HDGV - No
     1981 & later MYR test type:            Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)  Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5       Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______

______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.77  24.81   1.43   2.01   6.35
26.75  18.96
 Exhst  HC: 16.35  17.16  20.45  18.27  18.56   1.43   2.01   6.35
26.05  16.29
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45    U4 MIN ARTERY
                       0.21
 Runing HC:  0.08    0.05    0.07    0.06    0.16
        0.08
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 25.76   27.42   29.82   28.23   52.87    1.06    1.21    8.53
21.99  25.80
 Exhst NOX:  2.10    2.39    2.58    2.45    6.76    1.40    1.62   17.39
 1.14   2.41

------------------------------------------------------------------------------

0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low             Altitude:  500.
Ft.
                        I/M Program: Yes        Ambient Temp:   43:0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 30.0   30.0   30.0           30.0    30.0    30.0    30.0
 30.0
   VMT Mix:  0.840  0.076  0.039          0.013   0.012   0.001   0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.28    2.71    3.09    2.84    3.93    0.47    0.66    2.07
 4.30   2.35
 Exhst  HC:  1.84    2.20    2.47    2.29    2.71    0.47    0.66    2.07
 3.60   1.90
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.08    0.05    0.07    0.06    0.16
        0.08
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
```

OK

```
 Exhst  CO: 25.16   26.83   29.16   27.62   51.15    1.03    1.17    8.24
21.16  25.20
 Exhst NOX:  2.10    2.40    2.59    2.47    6.81    1.39    1.61   17.28
 1.15   2.42

------------------------------------------------------------------------------

0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
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```
 VOC    HC:  2.18    2.60    2.97    2.73    3.68    0.44    0.62    1.96
 4.12   2.24
 Exhst  HC:  1.75    2.10    2.35    2.18    2.47    0.44    0.62    1.96
 3.41   1.80
 Evap.  HC:   0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:   0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:   0.07    0.05    0.06    0.05    0.15
         0.07
 Rsting HC:   0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 24.08   25.76   27.97   26.51   48.19    0.96    1.10    7.73
19.64   24.11
 Exhst NOX:   2.12    2.43    2.62    2.50    6.92    1.38    1.60   17.15
 1.19   2.44
U   4          M    I    N    O    R          A    R    T    E    R    Y
_______________________________________________________________________________
___________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low             Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+          ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 33.0    33.0    33.0            33.0    33.0    33.0    33.0
 33.0
   VMT Mix:  0.840  0.076  0.039           0.013   0.012   0.001   0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.13    2.55    2.91    2.68    3.57    0.43    0.61    1.91
 4.04   2.20
 Exhst  HC:  1.70    2.05    2.30    2.13    2.37    0.43    0.61    1.91
 3.33   1.75
 Evap.  HC:   0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:   0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:   0.07    0.05    0.06    0.05    0.14
         0.07
 Rsting HC:   0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 23.59   25.27   27.42   26.00   46.93    0.94    1.07    7.51
18.94   23.61
 Exhst NOX:   2.12    2.44    2.63    2.51    6.98    1.38    1.59   17.11
 1.20   2.44
```

AF C-4-4-6

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______ ______U4
 Veh. Spd.: 35.0   35.0   35.0          35.0   35.0   35.0   35.0
 35.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.05   2.47   2.81   2.58   3.38   0.41   0.58   1.82
 3.89   2.11
 Exhst  HC:  1.62   1.97   2.20   2.05   2.18   0.41   0.58   1.82
 3.18   1.67
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.06   0.04   0.06   0.05   0.13
        0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 22.69  24.40  26.44  25.09  44.80   0.89   1.01   7.13
17.68  22.72
 Exhst NOX:  2.14   2.47   2.66   2.53   7.09   1.38   1.59  17.12
 1.23   2.46

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:  43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 36.0   36.0   36.0          36.0   36.0   36.0   36.0
 36.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.01   2.43   2.77   2.54   3.29   0.40   0.56   1.77
 3.82   2.07
 Exhst  HC:  1.59   1.93   2.15   2.01   2.10   0.40   0.56   1.77
 3.11   1.64
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.06   0.04   0.06   0.05   0.13
        0.06
```

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```
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 22.29   24.00   25.99   24.68   43.92    0.87    0.99    6.97
17.12  22.31
 Exhst NOX:  2.14    2.48    2.67    2.54    7.14    1.38    1.60   17.16
 1.24   2.47

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 37.0    37.0   37.0           37.0    37.0    37.0    37.0
 37.0
   VMT Mix:  0.840  0.076  0.039          0.013   0.012   0.001   0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.97    2.39    2.72    2.50    3.21    0.39    0.55    1.73
 3.75   2.03
 Exhst  HC:  1.56    1.89    2.11    1.97    2.03    0.39    0.55    1.73
 3.04   1.60
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.06    0.04    0.05    0.05    0.12
        0.06
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 21.90   23.64   25.58   24.29   43.15    0.85    0.97    6.82
16.59  21.93
 Exhst NOX:  2.15    2.49    2.68    2.55    7.20    1.39    1.60   17.23
 1.25   2.47

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
```

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```
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61       U4 MIN ARTERY
                     0.71    0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.05    0.04    0.05    0.04    0.12
        0.05
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00  0.00
 Exhst  CO: 21.21   22.99   24.82   23.61   41.92   0.82    0.93    6.57
15.65   21.25
 Exhst NOX:  2.16    2.51    2.70    2.57    7.31   1.40    1.62   17.44
 1.26   2.49

_____________________________________________________________________

0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:   500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.840  0.076  0.039        0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88    2.29    2.61    2.40    3.01    0.37    0.52    1.63
 3.59   1.93
 Exhst  HC:  1.47    1.80    2.00    1.87    1.83    0.37    0.52    1.63
 2.88   1.51
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71  0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.05    0.04    0.05    0.04    0.11
        0.05
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00  0.00
 Exhst  CO: 20.89   22.70   24.49   23.30   41.46    0.80    0.92    6.46
15.23   20.94
 Exhst NOX:  2.17    2.51    2.71    2.58    7.36    1.42    1.64   17.58
 1.27   2.50

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
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AP 6-4-4-9

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 Exhst NOX:  2.19   2.54   2.73   2.61   7.53   1.46   1.69  18.17
 1.29   2.53
                                                 U4    MIN    ARTERY
____________________________________________________________________

0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.77   2.19   2.49   2.29   2.81   0.34   0.48   1.51
 3.44   1.83
 Exhst  HC:  1.37   1.70   1.89   1.77   1.64   0.34   0.48   1.51
 2.73   1.41
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.04   0.03   0.05   0.04   0.10
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 19.81  21.76  23.35  22.30  40.54   0.77   0.88   6.17
13.91  19.89
 Exhst NOX:  2.20   2.55   2.74   2.61   7.58   1.48   1.71  18.42
 1.30   2.54

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

```
    U5 COLLECTOR CO WINTER INPUTS
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dist. 1990)
1          TAMFLG - default tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG -           vehicle mix State

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.845.076.039.010.012.001.012.005
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                           - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                             21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                         - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1       .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
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AP C-4-5-2

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1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
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[illegible]

```
    U5 COLLECTOR CO WINTER OUTPUTS
1            MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                1983
     Pre-1981 MYR stringency rate:           12%
     First model year covered:              1976
     Last model year covered:               2020
     Waiver rate (pre-1981):                 1.%
     Waiver rate (1981 and newer):           1.%
     Compliance Rate:                       80.%
     Inspection type:                          Computerized Test and
Repair
     Inspection frequency                   Annual
     Vehicle types covered:                 LDGV - Yes
                                           LDGT1 - Yes
                                           LDGT2 - Yes
                                            HDGV - No
     1981 & later MYR test type:            Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)   Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5        Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
________________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix: 0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC   HC: 19.08  19.43  23.37  20.77  24.81   1.43   2.01   6.35
26.75  18.96
 Exhst  HC: 16.35  17.16  20.45  18.27  18.56   1.43   2.01   6.35
26.05  16.29
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
```

Ap C-4-5-4

```
  25.0          U5 COLLECTOR
    VMT Mix:  0.840  0.076  0.039          0.013  0.012  0.001  0.015
 0.004
 0Composite Emission Factors (Gm/Mile)
  VOC    HC:  2.60   3.04   3.47   3.18   4.75   0.54   0.77   2.42
  4.84   2.67
  Exhst  HC:  2.14   2.52   2.83   2.63   3.50   0.54   0.77   2.42
  4.13   2.21
  Evap.  HC:  0.15   0.19   0.29   0.22   0.61
   0.71   0.16
  Refuel HC:  0.21   0.27   0.27   0.27   0.45
          0.21
  Runing HC:  0.10   0.06   0.08   0.07   0.19
          0.09
  Rsting HC:  0.00   0.00   0.00   0.00   0.00
   0.00   0.00
  Exhst  CO: 28.59  30.18  32.92  31.11  61.70   1.24   1.42   9.96
 25.84  28.66
  Exhst NOX:  2.06   2.32   2.51   2.38   6.54   1.46   1.68  18.07
  1.06   2.39

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 0Emission factors are as of Jan. 1st of the indicated calendar
 year.
 0User supplied veh registration distributions.
 0Cal. Year: 1990           Region: Low           Altitude:  500.
 Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
 / 43.0 / 43.0 F
                   Anti-tam. Program: No      Operating Mode:   20.6
 / 27.3 / 20.6
                    Reformulated Gas: No
 0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
  MC   All Veh
 +         ______ ______ ______ ______ ______ ______ ______ ______
 _____ _____
  Veh. Spd.: 26.0   26.0   26.0          26.0   26.0   26.0   26.0
  26.0
    VMT Mix:  0.840  0.076  0.039          0.013  0.012  0.001  0.015
 0.004
 0Composite Emission Factors (Gm/Mile)
  VOC    HC:  2.53   2.96   3.38   3.11   4.56   0.53   0.74   2.34
  4.72   2.60
  Exhst  HC:  2.07   2.45   2.75   2.55   3.31   0.53   0.74   2.34
  4.01   2.14
  Evap.  HC:  0.15   0.19   0.29   0.22   0.61
   0.71   0.16
  Refuel HC:  0.21   0.27   0.27   0.27   0.45
          0.21
  Runing HC:  0.09   0.06   0.08   0.07   0.18
          0.09
  Rsting HC:  0.00   0.00   0.00   0.00   0.00
   0.00   0.00
```

AP C-4-5-5

```
U5                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+              ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 28.0   28.0   28.0          28.0   28.0   28.0   28.0
 28.0
   VMT Mix:  0.840  0.076  0.039        0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.40   2.83   3.23   2.96   4.22   0.49   0.70   2.20
 4.50   2.47
 Exhst  HC:  1.95   2.32   2.60   2.41   2.98   0.49   0.70   2.20
 3.79   2.01
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.09   0.06   0.07   0.06   0.17
        0.08
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 26.39  28.05  30.52  28.89  54.77   1.10   1.26   8.84
22.87  26.44
 Exhst NOX:  2.09   2.37   2.56   2.44   6.70   1.41   1.63  17.52
 1.12   2.41

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:  43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:  20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+              ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 29.0   29.0   29.0          29.0   29.0   29.0   29.0
 29.0
   VMT Mix:  0.840  0.076  0.039        0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.34   2.76   3.16   2.90   4.07   0.48   0.68   2.14
 4.40   2.40
 Exhst  HC:  1.89   2.26   2.53   2.35   2.84   0.48   0.68   2.14
 3.69   1.95
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
```

Ap C-4-5-6

```
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.08    0.05    0.07    0.06    0.16
        0.08
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
 0.00   0.00
 Exhst  CO: 25.76   27.42   29.82   28.23   52.87    1.06    1.21    8.53
21.99   25.80
 Exhst NOX:  2.10    2.39    2.58    2.45    6.76    1.40    1.62   17.39
1.14    2.41

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 30.0    30.0    30.0            30.0    30.0    30.0    30.0
 30.0
   VMT Mix:  0.840  0.076  0.039           0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.28    2.71    3.09    2.84    3.93    0.47    0.66    2.07
 4.30   2.35
 Exhst  HC:  1.84    2.20    2.47    2.29    2.71    0.47    0.66    2.07
 3.60   1.90
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.08    0.05    0.07    0.06    0.16
        0.08
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 25.16   26.83   29.16   27.62   51.15    1.03    1.17    8.24
21.16   25.20
 Exhst NOX:  2.10    2.40    2.59    2.47    6.81    1.39    1.61   17.28
 1.15   2.42

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
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Ap. C 4-5-7

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0Cal. Year: 1990           Region: Low          Altitude:   500.
Ft.
                      I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh                 U5 COLLECTOR
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 31.0   31.0   31.0          31.0   31.0   31.0   31.0
 31.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.23   2.65   3.03   2.78   3.80   0.45   0.64   2.02
 4.21   2.29
 Exhst  HC:  1.79   2.15   2.41   2.24   2.58   0.45   0.64   2.02
 3.50   1.85
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.08   0.05   0.07   0.06   0.15
        0.07
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 24.60  26.28  28.54  27.05  49.59   0.99   1.13   7.97
20.38  24.64
 Exhst NOX:  2.11   2.42   2.61   2.48   6.87   1.39   1.60  17.20
 1.17   2.43

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:   500.
Ft.
                      I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 32.0   32.0   32.0          32.0   32.0   32.0   32.0
 32.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
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AP 6-4-5-8

```
 VOC    HC:  2.18   2.60   2.97   2.73   3.68   0.44   0.62   1.96
 4.12   2.24
 Exhst  HC:  1.75   2.10   2.35   2.18   2.47   0.44   0.62   1.96
 3.41   1.80
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.15
        0.07
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 24.08  25.76  27.97  26.51  48.19   0.96   1.10   7.73
19.64  24.11
 Exhst NOX:  2.12   2.43   2.62   2.50   6.92   1.38   1.60  17.15
 1.19   2.44

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes         Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC    All Veh
+            _____  _____  _____  _____  _____  _____  _____  _____
_____  _____
 Veh. Spd.: 33.0   33.0   33.0          33.0   33.0   33.0   33.0
 33.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.13   2.55   2.91   2.68   3.57   0.43   0.61   1.91
 4.04   2.20
 Exhst  HC:  1.70   2.05   2.30   2.13   2.37   0.43   0.61   1.91
 3.33   1.75
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.14
        0.07
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 23.59  25.27  27.42  26.00  46.93   0.94   1.07   7.51
18.94  23.61
 Exhst NOX:  2.12   2.44   2.63   2.51   6.98   1.38   1.59  17.11
 1.20   2.44
```

Ap C-4-5-9

```
U5 COLLECTOR_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09   2.51   2.86   2.63   3.47   0.42   0.59   1.86
3.96   2.15
 Exhst  HC:  1.66   2.01   2.25   2.09   2.27   0.42   0.59   1.86
3.25   1.71
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.14
        0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 23.13  24.82  26.92  25.53  45.80   0.91   1.04   7.31
18.29  23.15
 Exhst NOX:  2.13   2.46   2.64   2.52   7.03   1.38   1.59  17.11
 1.21   2.45

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
```

```
 Rsting HC:  0.00   0.00   0.00   0.00   0.00   U5 COLLECTOR
              0.00   0.00
 Exhst  CO: 22.29  24.00  25.99  24.68  43.92   0.87   0.99   6.97
17.12  22.31
 Exhst NOX:  2.14   2.48   2.67   2.54   7.14   1.38   1.60  17.16
 1.24   2.47

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
               Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+
          ______ ______ ______ ______ ______ ______ ______ ______
_____  _____
 Veh. Spd.: 37.0   37.0   37.0          37.0   37.0   37.0   37.0
 37.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.97   2.39   2.72   2.50   3.21   0.39   0.55   1.73
 3.75   2.03
 Exhst  HC:  1.56   1.89   2.11   1.97   2.03   0.39   0.55   1.73
 3.04   1.60
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.06   0.04   0.05   0.05   0.12
        0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 21.90  23.64  25.58  24.29  43.15   0.85   0.97   6.82
16.59  21.93
 Exhst NOX:  2.15   2.49   2.68   2.55   7.20   1.39   1.60  17.23
 1.25   2.47

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
```

AP C.4-5-11

```
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61     U5 COLLECTOR
              0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
          0.21
 Runing HC:  0.05   0.04   0.05   0.04   0.12
          0.05
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 21.21  22.99  24.82  23.61  41.92   0.82   0.93   6.57
15.65  21.25
 Exhst NOX:  2.16   2.51   2.70   2.57   7.31   1.40   1.62  17.44
 1.26   2.49

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.840  0.076  0.039         0.013  0.012  0.001  0.015
0.004
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88   2.29   2.61   2.40   3.01   0.37   0.52   1.63
 3.59   1.93
 Exhst  HC:  1.47   1.80   2.00   1.87   1.83   0.37   0.52   1.63
 2.88   1.51
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
          0.21
 Runing HC:  0.05   0.04   0.05   0.04   0.11
          0.05
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.89  22.70  24.49  23.30  41.46   0.80   0.92   6.46
15.23  20.94
 Exhst NOX:  2.17   2.51   2.71   2.58   7.36   1.42   1.64  17.58
 1.27   2.50

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
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```
 U6 LOCAL CO WINTER INPUTS
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dist. 1990)
1          TAMFLG - default tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG -         vehicle mix state

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3            NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.845.076.039.010.012.001.012.005
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
```

```
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1       .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
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1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
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AT L.4-6-3

```
   U6 LOCAL  CO WINTER  OUTPUTS
1             MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):              1983
     Pre-1981 MYR stringency rate:         12%
     First model year covered:            1976
     Last model year covered:             2020
     Waiver rate (pre-1981):               1.%
     Waiver rate (1981 and newer):         1.%
     Compliance Rate:                     80.%
     Inspection type:                        Computerized Test and
Repair
     Inspection frequency                 Annual
     Vehicle types covered:               LDGV - Yes
                                         LDGT1 - Yes
                                         LDGT2 - Yes
                                          HDGV - No
     1981 & later MYR test type:          Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)   Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5        Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_____________________________________________________________________
_______________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.77  24.81   1.43   2.01   6.35
26.75  18.99
 Exhst  HC: 16.35  17.16  20.45  18.27  18.56   1.43   2.01   6.35
26.05  16.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Runing HC:  0.14    0.09    0.11    0.09    0.26          U6 LOCAL
                             0.13
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 34.98   36.04   39.78   37.31   83.09    1.65    1.89   13.28
34.12   35.03
 Exhst NOX:  2.02    2.19    2.38    2.26    6.21    1.61    1.86   19.99
 0.94   2.29

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+          ------  ------  ------  ------  ------  ------  ------  ------
------  ------
 Veh. Spd.: 20.0   20.0   20.0            20.0    20.0    20.0    20.0
 20.0
   VMT Mix:  0.845  0.076  0.039          0.010   0.012   0.001   0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  3.06    3.51    4.02    3.68    6.02    0.65    0.91    2.89
5.55    3.14
 Exhst  HC:  2.58    2.98    3.36    3.11    4.71    0.65    0.91    2.89
4.84    2.65
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
 0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.12    0.08    0.10    0.09    0.24
        0.11
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 33.58   34.84   38.35   36.03   78.63    1.57    1.79   12.60
32.42   33.64
 Exhst NOX:  2.02    2.20    2.39    2.26    6.26    1.58    1.82   19.58
 0.96   2.29

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
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Ap C.4-6-5

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_______________U6 LOCAL
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 24.0   24.0   24.0          24.0   24.0   24.0   24.0
 24.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.68   3.12   3.56   3.27   4.96   0.56   0.79   2.50
 4.96   2.75
 Exhst  HC:  2.22   2.60   2.92   2.71   3.70   0.56   0.79   2.50
 4.26   2.28
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.10   0.07   0.09   0.07   0.20
        0.10
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 29.43  30.99  33.84  31.95  64.48   1.30   1.48  10.40
26.97  29.46
 Exhst NOX:  2.06   2.30   2.49   2.36   6.48   1.47   1.70  18.31
 1.04   2.32

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_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 25.0   25.0   25.0          25.0   25.0   25.0   25.0
 25.0                                                                   U6-LOCAL
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.60   3.04   3.47   3.18   4.75   0.54   0.77   2.42
 4.84   2.67
 Exhst  HC:  2.14   2.52   2.83   2.63   3.50   0.54   0.77   2.42
 4.13   2.20
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.10   0.06   0.08   0.07   0.19
         0.09
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 28.59  30.18  32.92  31.11  61.70   1.24   1.42   9.96
25.84  28.62
 Exhst NOX:  2.06   2.32   2.51   2.38   6.54   1.46   1.68  18.07
 1.06   2.33

___________________________________________________________________

0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 26.0   26.0   26.0          26.0   26.0   26.0   26.0
 26.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.53   2.96   3.38   3.11   4.56   0.53   0.74   2.34
 4.72   2.60
 Exhst  HC:  2.07   2.45   2.75   2.55   3.31   0.53   0.74   2.34
 4.01   2.13
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.09   0.06   0.08   0.07   0.18
         0.09
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
```

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 Exhst  CO: 27.80  29.43  32.06  30.32  59.17   1.19   1.36   9.55
24.79  27.83
 Exhst NOX:  2.07   2.34   2.53   2.40   6.59   1.44   1.66  17.86
 1.08   2.33

_________________________________________________________________________
_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 27.0   27.0   27.0          27.0   27.0   27.0   27.0
 27.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.46   2.89   3.30   3.03   4.38   0.51   0.72   2.27
 4.61   2.53
 Exhst  HC:  2.01   2.38   2.67   2.48   3.14   0.51   0.72   2.27
 3.90   2.07
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.09   0.06   0.08   0.06   0.18
         0.09
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 27.07  28.72  31.26  29.58  56.86   1.14   1.31   9.18
23.80  27.09
 Exhst NOX:  2.08   2.36   2.54   2.42   6.65   1.42   1.64  17.68
 1.10   2.34

_________________________________________________________________________
_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
```

```
                   Reformulated Gas: No                       U6 LOCAL
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            _____  _____  _____  _____  _____  _____  _____  _____
_____ _____
 Veh. Spd.: 28.0   28.0   28.0            28.0   28.0   28.0   28.0
 28.0
   VMT Mix:  0.845  0.076  0.039          0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.40   2.83   3.23   2.96    4.22   0.49   0.70   2.20
 4.50   2.46
 Exhst  HC:  1.95   2.32   2.60   2.41    2.98   0.49   0.70   2.20
 3.79   2.01
 Evap.  HC:  0.15   0.19   0.29   0.22    0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27    0.45
        0.21
 Runing HC:  0.09   0.06   0.07   0.06    0.17
        0.08
 Rsting HC:  0.00   0.00   0.00   0.00    0.00
  0.00   0.00
 Exhst  CO: 26.39  28.05  30.52  28.89   54.77   1.10   1.26   8.84
22.87  26.41
 Exhst NOX:  2.09   2.37   2.56   2.44    6.70   1.41   1.63  17.52
 1.12   2.35

______________________________________________________________________

____________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                        I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            _____  _____  _____  _____  _____  _____  _____  _____
_____ _____
 Veh. Spd.: 29.0   29.0   29.0            29.0   29.0   29.0   29.0
 29.0
   VMT Mix:  0.845  0.076  0.039          0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.34   2.76   3.16   2.90    4.07   0.48   0.68   2.14
 4.40   2.40
 Exhst  HC:  1.89   2.26   2.53   2.35    2.84   0.48   0.68   2.14
 3.69   1.95
 Evap.  HC:  0.15   0.19   0.29   0.22    0.61
  0.71   0.16
```

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```
 Refuel HC:  0.21   0.27   0.27   0.27   0.45                U6 LOCAL
                 0.21
 Runing HC:  0.08   0.05   0.07   0.06   0.16
         0.08
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 25.76  27.42  29.82  28.23  52.87   1.06   1.21   8.53
21.99  25.77
 Exhst NOX:  2.10   2.39   2.58   2.45   6.76   1.40   1.62  17.39
 1.14   2.35

______________________________________________________________________________
_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43:0
/ 43.0 / 43.0 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 30.0   30.0   30.0          30.0   30.0   30.0   30.0
 30.0
   VMT Mix:  0.845  0.076  0.039        0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.28   2.71   3.09   2.84   3.93   0.47   0.66   2.07
 4.30   2.35
 Exhst  HC:  1.84   2.20   2.47   2.29   2.71   0.47   0.66   2.07
 3.60   1.90
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.08   0.05   0.07   0.06   0.16
         0.08
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 25.16  26.83  29.16  27.62  51.15   1.03   1.17   8.24
21.16  25.17
 Exhst NOX:  2.10   2.40   2.59   2.47   6.81   1.39   1.61  17.28
 1.15   2.36

______________________________________________________________________________
_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
```

```
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No    Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh                                                U6 LOCAL
+
          ______ ______ ______ ______ ______ ______ ______ ______
_____  ______
 Veh. Spd.: 31.0   31.0   31.0          31.0   31.0   31.0   31.0
 31.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.23   2.65   3.03   2.78   3.80   0.45   0.64   2.02
 4.21   2.29
 Exhst  HC:  1.79   2.15   2.41   2.24   2.58   0.45   0.64   2.02
 3.50   1.85
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.08   0.05   0.07   0.06   0.15
        0.07
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
 0.00   0.00
 Exhst  CO: 24.60  26.28  28.54  27.05  49.59   0.99   1.13   7.97
20.38  24.61
 Exhst NOX:  2.11   2.42   2.61   2.48   6.87   1.39   1.60  17.20
 1.17   2.37


__________________________________________________________________

_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No    Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+
          ______ ______ ______ ______ ______ ______ ______ ______
_____  ______
 Veh. Spd.: 32.0   32.0   32.0          32.0   32.0   32.0   32.0
 32.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
```

```
 VOC    HC:  2.18    2.60    2.97    2.73    3.68    0.44    0.62    1.96
 4.12   2.24
 Exhst  HC:  1.75    2.10    2.35    2.18    2.47    0.44    0.62    1.96
 3.41   1.80
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.07    0.05    0.06    0.05    0.15
        0.07
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 24.08   25.76   27.97   26.51   48.19    0.96    1.10    7.73
19.64  24.08
 Exhst NOX:  2.12    2.43    2.62    2.50    6.92    1.38    1.60   17.15
 1.19   2.37
 _______________________________________________________________________U6
LOCAL_____________________________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 33.0   33.0   33.0          33.0   33.0   33.0   33.0
 33.0
   VMT Mix:  0.845  0.076  0.039         0.010  0.012  0.001  0.012
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.13    2.55    2.91    2.68    3.57    0.43    0.61    1.91
 4.04   2.20
 Exhst  HC:  1.70    2.05    2.30    2.13    2.37    0.43    0.61    1.91
 3.33   1.75
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.07    0.05    0.06    0.05    0.14
        0.07
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 23.59   25.27   27.42   26.00   46.93    0.94    1.07    7.51
18.94  23.59
 Exhst NOX:  2.12    2.44    2.63    2.51    6.98    1.38    1.59   17.11
 1.20   2.38
```

AT C-4-6-12

[illegible]

```
1            PROMPT - vertical flag input, no prompting
             MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dist. 1990)
1            TAMFLG - default tampering rates

1            SPDFLG - one speed per scenario
3            VMFLAG -          vehicle mix state

3           MYMRFG - local registration and default mileage accrual
rates
1            NEWFLG - default exhaust emission rates

2            IMFLAG - include I/M program

1            ALHFLG - no additional correction factor inputs

1            ATPFLG - no anti-tampering program

1             RLFLAG - Stage II vapor recovery program not in Base
Year
2           LOCFLG - read in local area parameters one time for all
scenarios
1            TEMFLG - use max/min temps
4            OUTFMT - 80 column descriptive format

4                       PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2            IDLFLG - print idle emissions results

3               NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4            HCFLAG - tot & comps HC

.739.058.030.025.010.001.131.006
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
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Ar C-4-7-1

```
.003 .002 .002 .001 .007                        - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                           21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                        - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11              .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1     .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
1 90 44.0 40.0 20.6 27.3 20.6
```

A7 C.4-7-2

P1-CC

```
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
```

A7 L-4-7-3

RI CO INPUTS

```
1              MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0     Start year (January 1):                 1983
      Pre-1981 MYR stringency rate:            12%
      First model year covered:               1976
      Last model year covered:                2020
      Waiver rate (pre-1981):                  1.%
      Waiver rate (1981 and newer):            1.%
      Compliance Rate:                        80.%
      Inspection type:                           Computerized Test and
Repair
      Inspection frequency                    Annual
      Vehicle types covered:                  LDGV - Yes
                                             LDGT1 - Yes
                                             LDGT2 - Yes
                                              HDGV - No
      1981 & later MYR test type:             Idle
      Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)   Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5        Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
________________
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix:  0.739  0.058  0.030        0.025  0.010  0.001  0.131
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.78  24.81   1.43   2.01   6.35
26.75  17.56
 Exhst  HC: 16.35  17.16  20.45  18.28  18.56   1.43   2.01   6.35
26.05  15.16
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.15
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
```

A7   C.4-7-4

```
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 58.0   58.0   58.0          58.0   58.0   58.0   58.0
 58.0
   VMT Mix:  0.739  0.058  0.030        0.025  0.010  0.001  0.131
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.92   2.43   2.76   2.54   2.51   0.30   0.42   1.31
 3.94   1.90
 Exhst  HC:  1.54   1.96   2.18   2.03   1.38   0.30   0.42   1.31
 3.23   1.55
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.15
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.19
 Runing HC:  0.02   0.02   0.03   0.02   0.06
        0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 28.79  33.76  36.34  34.64  49.46   0.82   0.94   6.60
22.38  26.57
 Exhst NOX:  3.21   3.66   3.99   3.77   8.36   2.09   2.41  25.92
 1.77   6.35

______________________________________________________________________
______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 59.0   59.0   59.0          59.0   59.0   59.0   59.0
 59.0
   VMT Mix:  0.739  0.058  0.030        0.025  0.010  0.001  0.131
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.00   2.54   2.88   2.66   2.51   0.29   0.42   1.31
```

1H7   C-4-7-5   5

```
 4.13   1.98
 Exhst  HC:  1.62   2.07   2.30   2.15   1.38   0.29   0.42   1.31
 3.42   1.62
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.15
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.19
 Runing HC:  0.02   0.02   0.03   0.02   0.06
         0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 32.07  37.98  40.96  39.00  51.00   0.84   0.96   6.72
25.50  29.45
 Exhst NOX:  3.31   3.77   4.11   3.89   8.41   2.16   2.50  26.85
 1.81   6.55

___________________________________________________________________

_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 60.0   60.0   60.0          60.0   60.0   60.0   60.0
 60.0
   VMT Mix:  0.739  0.058  0.030        0.025  0.010  0.001  0.131
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.08   2.65   3.01   2.77   2.51   0.29   0.41   1.31
 4.32   2.05
 Exhst  HC:  1.70   2.18   2.43   2.26   1.39   0.29   0.41   1.31
 3.61   1.69
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.15
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.19
 Runing HC:  0.02   0.02   0.03   0.02   0.06
         0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 35.36  42.20  45.57  43.35  52.71   0.85   0.98   6.86
28.63  32.34
 Exhst NOX:  3.41   3.88   4.23   4.00   8.47   2.24   2.59  27.85
 1.86   6.77
```

R.2 CO Inputs winter

```
1           PROMPT - vertical flag input, no prompting
            MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dist. 1990)
1           TAMFLG - default tampering rates

1           SPDFLG - one speed per scenario
3           VMFLAG -          vehicle mix-state

3          MYMRFG - local registration and default mileage accrual
rates
1           NEWFLG - default exhaust emission rates

2           IMFLAG - include I/M program

1           ALHFLG - no additional correction factor inputs

1           ATPFLG - no anti-tampering program

1            RLFLAG - Stage II vapor recovery program not in Base
Year
2          LOCFLG - read in local area parameters one time for all
scenarios
1           TEMFLG - use max/min temps
4           OUTFMT - 80 column descriptive format

4                    PRTFLG   -   print   VOC,   CO,   and   NOx   values
[1-VOC,2-CO,3-NOx,4-all]
2           IDLFLG - print idle emissions results

3             NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4           HCFLAG - tot & comps HC

.830.071.037.020.012.001.027.002
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
```

AP C-4-8-1

```
.003 .002 .002 .001 .007                                     - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                                       21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                                     - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                            .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1                  .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
1 90 44.0 40.0 20.6 27.3 20.6
```

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1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
```

AT 2·4-8-3

```
1            PROMPT - vertical flag input, no prompting
             MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dist. 1990)
1            TAMFLG - default tampering rates

1            SPDFLG - one speed per scenario
3            VMFLAG - default vehicle mix

3           MYMRFG - local registration and default mileage accrual
rates
1            NEWFLG - default exhaust emission rates

2            IMFLAG - include I/M program

1            ALHFLG - no additional correction factor inputs

1            ATPFLG - no anti-tampering program

1             RLFLAG - Stage II vapor recovery program not in Base
Year
2           LOCFLG - read in local area parameters one time for all
scenarios
1            TEMFLG - use max/min temps
4            OUTFMT - 80 column descriptive format

4                       PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2            IDLFLG - print idle emissions results

3               NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4            HCFLAG - tot & comps HC

.830.071.037.020.012.001.027.002
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
```

```
1            MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                 1983
     Pre-1981 MYR stringency rate:            12%
     First model year covered:               1976
     Last model year covered:                2020
     Waiver rate (pre-1981):                  1.%
     Waiver rate (1981 and newer):            1.%
     Compliance Rate:                        80.%
     Inspection type:                           Computerized Test and
Repair
     Inspection frequency                    Annual
     Vehicle types covered:                    LDGV - Yes
                                              LDGT1 - Yes
                                              LDGT2 - Yes
                                               HDGV - No
     1981 & later MYR test type:             Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)  Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5      Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
_______________

0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
  VMT Mix: 0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.78  24.81   1.43   2.01   6.35
26.75  18.82
 Exhst  HC: 16.35  17.16  20.45  18.28  18.56   1.43   2.01   6.35
26.05  16.16
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
```

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```
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 41.0   41.0   41.0           41.0   41.0   41.0   41.0
 41.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.85   2.26   2.58   2.37   2.95   0.36   0.51   1.60
 3.55   1.90
 Exhst  HC:  1.44   1.77   1.97   1.84   1.78   0.36   0.51   1.60
 2.84   1.48
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.05   0.04   0.05   0.04   0.11
        0.05
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.60  22.43  24.17  23.03  41.09   0.79   0.91  16.37
14.86  20.61
 Exhst NOX:  2.17   2.52   2.72   2.59   7.42   1.43   1.65  17.75
 1.28   2.73

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 42.0   42.0   42.0           42.0   42.0   42.0   42.0
 42.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
```

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0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.82   2.24   2.54   2.34   2.90   0.35   0.50   1.57
 3.51   1.88
 Exhst  HC:  1.41   1.75   1.94   1.81   1.73   0.35   0.50   1.57
 2.80   1.46
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.05   0.04   0.05   0.04   0.11
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.32  22.19  23.88  22.77  40.82   0.78   0.89   6.29
14.51  20.35
 Exhst NOX:  2.18   2.53   2.72   2.60   7.47   1.44   1.67  17.94
 1.29   2.75

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 43.0   43.0   43.0          43.0   43.0   43.0   43.0
 43.0
   VMT Mix:  0.830  0.071  0.037        0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.79   2.21   2.52   2.32   2.85   0.35   0.49   1.54
 3.47   1.85
 Exhst  HC:  1.39   1.72   1.91   1.79   1.69   0.35   0.49   1.54
 2.76   1.43
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.04   0.04   0.05   0.04   0.10
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.05  21.97  23.61  22.53  40.64   0.78   0.88   6.22
14.19  20.10
 Exhst NOX:  2.19   2.54   2.73   2.61   7.53   1.46   1.69  18.17
```

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+         _______ _______ _______ _______ _______ _______ _______ _______
_______ _______
 Veh. Spd.: 45.0    45.0    45.0            45.0    45.0    45.0    45.0
 45.0
   VMT Mix:  0.830   0.071   0.037           0.020   0.012   0.001   0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.75    2.17    2.46    2.27    2.77    0.33    0.47    1.49
 3.42   1.80
 Exhst  HC:  1.35    1.68    1.86    1.74    1.61    0.33    0.47    1.49
 2.71   1.39
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.04    0.03    0.04    0.04    0.10
         0.04
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 19.57   21.58   23.12   22.10   40.54    0.76    0.87    6.13
13.65  19.65
 Exhst NOX:  2.20    2.55    2.75    2.62    7.64    1.51    1.74   18.70
 1.31   2.79

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV    LDDT    HDDV
 MC   All Veh
+         _______ _______ _______ _______ _______ _______ _______ _______
_______ _______
 Veh. Spd.: 46.0    46.0    46.0            46.0    46.0    46.0    46.0
 46.0
   VMT Mix:  0.830   0.071   0.037           0.020   0.012   0.001   0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.72    2.15    2.44    2.25    2.73    0.33    0.47    1.47
 3.39   1.78
 Exhst  HC:  1.33    1.66    1.84    1.72    1.57    0.33    0.47    1.47
 2.69   1.37
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.04    0.03    0.04    0.04    0.09
```

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```
        0.04
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 19.35   21.40   22.89   21.91   40.62    0.76    0.87    6.09
13.41  19.44
 Exhst NOX:  2.21    2.56    2.76    2.63    7.69    1.53    1.77   19.01
 1.32   2.81

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low           Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ ______
 Veh. Spd.: 47.0   47.0   47.0          47.0   47.0   47.0   47.0
 47.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.70    2.13    2.42    2.23    2.70    0.33    0.46    1.45
 3.37   1.76
 Exhst  HC:  1.31    1.65    1.82    1.70    1.54    0.33    0.46    1.45
 2.67   1.35
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.03    0.03    0.04    0.03    0.09
        0.03
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 19.15   21.24   22.69   21.74   40.80    0.76    0.86    6.07
13.19  19.25
 Exhst NOX:  2.22    2.57    2.77    2.64    7.75    1.56    1.80   19.36
 1.32   2.83

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low           Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
```

Ap   C.4-8-9

```
/ 43.0 / 43.0 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 48.0   48.0   48.0          48.0   48.0   48.0   48.0
 48.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.21   2.67   0.32   0.45   1.43
 3.36   1.74
 Exhst  HC:  1.29   1.63   1.80   1.69   1.51   0.32   0.45   1.43
 2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.04   0.03   0.09
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.57  41.07   0.76   0.86   6.06
12.99  19.08
 Exhst NOX:  2.23   2.58   2.78   2.65   7.81   1.59   1.84  19.74
 1.33   2.85

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 49.0   49.0   49.0          49.0   49.0   49.0   49.0
 49.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.21   2.64   0.32   0.45   1.41
 3.36   1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.49   0.32   0.45   1.41
```

A7? c.4-8-10

```
 2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.04   0.03   0.08
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.57  41.42   0.76   0.86   6.07
12.99  19.08
 Exhst NOX:  2.33   2.69   2.90   2.76   7.86   1.62   1.88  20.15
 1.38   2.95

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 50.0   50.0   50.0          50.0   50.0   50.0   50.0
 50.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.21   2.61   0.31   0.44   1.40
 3.36   1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.47   0.31   0.44   1.40
 2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.04   0.03   0.08
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.57  41.88   0.76   0.86   6.08
12.99  19.09
 Exhst NOX:  2.42   2.80   3.02   2.87   7.92   1.66   1.92  20.61
 1.42   3.06

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   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.20   2.57   0.31   0.43   1.37
3.36   1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.43   0.31   0.43   1.37
2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
 0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.03   0.03   0.07
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
 0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.57  43.08   0.76   0.87   6.14
12.99  19.12
 Exhst NOX:  2.62   3.01   3.26   3.10   8.03   1.74   2.01  21.64
 1.51   3.28

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low             Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 53.0   53.0   53.0          53.0   53.0   53.0   53.0
 53.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.20   2.55   0.30   0.43   1.36
 3.36   1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.42   0.30   0.43   1.36
 2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
 0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.03   0.03   0.07
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
 0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.57  43.85   0.77   0.88   6.18
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47   L-4-8-12

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12.99  19.13
 Exhst NOX:  2.72   3.12   3.38   3.21   8.08   1.79   2.07  22.22
 1.55   3.39

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 54.0   54.0   54.0          54.0   54.0   54.0   54.0
 54.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.67   2.11   2.39   2.20   2.54   0.30   0.43   1.35
 3.36   1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.41   0.30   0.43   1.35
 2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.02   0.03   0.03   0.07
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.57  44.72   0.78   0.89   6.24
12.99  19.15
 Exhst NOX:  2.82   3.23   3.50   3.32   8.14   1.84   2.13  22.85
 1.60   3.51

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
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A3 c.4-8-13

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Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 58.0   58.0   58.0          58.0   58.0   58.0   58.0
 58.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.92   2.43   2.76   2.55   2.51   0.30   0.42   1.31
 3.94   1.97
 Exhst  HC:  1.54   1.96   2.18   2.03   1.38   0.30   0.42   1.31
 3.23   1.57
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.02   0.02   0.03   0.02   0.06
        0.02
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 28.79  33.76  36.34  34.64  49.46   0.82   0.94   6.60
22.38  28.86
 Exhst NOX:  3.21   3.66   3.99   3.77   8.36   2.09   2.41  25.92
 1.77   3.97

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 59.0   59.0   59.0          59.0   59.0   59.0   59.0
 59.0
   VMT Mix:  0.830  0.071  0.037         0.020  0.012  0.001  0.027
0.002
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.00   2.54   2.88   2.66   2.51   0.29   0.42   1.31
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   R3 MINOR ARTERY  MOBILE5a INPUTS  CO WINTER 10/12/93
1           PROMPT - vertical flag input, no prompting
            MOBILE 5a CO 1990 Base Year Emissions Inv.  (w/state age
dist. 1990)
1           TAMFLG - default tampering rates

1           SPDFLG - one speed per scenario
3           VMFLAG -             vehicle mix-state

3          MYMRFG - local registration and default mileage accrual
rates
1           NEWFLG - default exhaust emission rates

2           IMFLAG - include I/M program

1           ALHFLG - no additional correction factor inputs

1           ATPFLG - no anti-tampering program

1            RLFLAG - Stage II vapor recovery program not in Base
Year
2          LOCFLG - read in local area parameters one time for all
scenarios
1           TEMFLG - use max/min temps
4           OUTFMT - 80 column descriptive format

4                    PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2           IDLFLG - print idle emissions results

3              NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4           HCFLAG - tot & comps HC

.836.074.038.012.012.001.021.006
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1       .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
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AP C-4-9-2

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1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09   2.51   2.86   2.63   3.47   0.42   0.59   1.86
 3.96   2.15
 Exhst  HC:  1.66   2.01   2.25   2.09   2.27   0.42   0.59   1.86
 3.25   1.72
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.14
        0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 23.13  24.82  26.92  25.53  45.80   0.91   1.04   7.31
18.29  23.02
 Exhst NOX:  2.13   2.46   2.64   2.52   7.03   1.38   1.59  17.11
 1.21   2.53

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
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AT C.4-9-4

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                  Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 38.0   38.0   38.0           38.0   38.0   38.0   38.0
 38.0
   VMT Mix:  0.836  0.074  0.038          0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.94   2.35   2.68   2.47   3.14   0.38   0.54   1.70
 3.69   2.00
 Exhst  HC:  1.52   1.86   2.07   1.93   1.96   0.38   0.54   1.70
 2.99   1.57
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.06   0.04   0.05   0.04   0.12
        0.05
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 21.55  23.30  25.19  23.94  42.49   0.83   0.95   6.68
16.10  21.45
 Exhst NOX:  2.16   2.50   2.69   2.56   7.25   1.39   1.61  17.32
 1.26   2.57

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 39.0   39.0   39.0           39.0   39.0   39.0   39.0
 39.0
   VMT Mix:  0.836  0.074  0.038          0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.91   2.32   2.64   2.43   3.07   0.37   0.53   1.66
 3.64   1.97
 Exhst  HC:  1.49   1.83   2.04   1.90   1.89   0.37   0.53   1.66
 2.93   1.54
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  Evap.  HC:  0.15    0.19    0.29    0.22    0.61
   0.71   0.16
  Refuel HC:  0.21    0.27    0.27    0.27    0.45
          0.21
  Runing HC:  0.05    0.04    0.05    0.04    0.12
          0.05
  Rsting HC:  0.00    0.00    0.00    0.00    0.00
   0.00   0.00
  Exhst  CO: 21.21   22.99   24.82   23.61   41.92    0.82    0.93    6.57
15.65  21.12
  Exhst NOX:  2.16    2.51    2.70    2.57    7.31    1.40    1.62   17.44
  1.26   2.57

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low              Altitude:  500.
Ft.
                        I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88    2.29    2.61    2.40    3.01    0.37    0.52    1.63
 3.59   1.93
 Exhst  HC:  1.47    1.80    2.00    1.87    1.83    0.37    0.52    1.63
 2.88   1.51
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.05    0.04    0.05    0.04    0.11
         0.05
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 20.89   22.70   24.49   23.30   41.46    0.80    0.92    6.46
15.23  20.81
 Exhst NOX:  2.17    2.51    2.71    2.58    7.36    1.42    1.64   17.58
 1.27   2.59

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
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spd 42

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0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.82   2.24   2.54   2.34   2.90   0.35   0.50   1.57
 3.51   1.88
 Exhst  HC:  1.41   1.75   1.94   1.81   1.73   0.35   0.50   1.57
 2.80   1.46
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.05   0.04   0.05   0.04   0.11
         0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.32  22.19  23.88  22.76  40.82   0.78   0.89   6.29
14.51  20.25
 Exhst NOX:  2.18   2.53   2.72   2.60   7.47   1.44   1.67  17.94
 1.29   2.61

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low         Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______

______ ______
 Veh. Spd.: 43.0   43.0   43.0          43.0   43.0   43.0   43.0
 43.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.79   2.21   2.52   2.32   2.85   0.35   0.49   1.54
 3.47   1.85
 Exhst  HC:  1.39   1.72   1.91   1.79   1.69   0.35   0.49   1.54
 2.76   1.44
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.04   0.04   0.05   0.04   0.10
         0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.05  21.97  23.61  22.52  40.64   0.78   0.88   6.22
14.19  20.00
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 Exhst NOX:  2.19   2.54   2.73   2.61   7.53   1.46   1.69  18.17
 1.29   2.62

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 44.0   44.0   44.0          44.0   44.0   44.0   44.0
 44.0
   VMT Mix:  0.836  0.074  0.038        0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.77   2.19   2.49   2.29   2.81   0.34   0.48   1.51
 3.44   1.83
 Exhst  HC:  1.37   1.70   1.89   1.77   1.64   0.34   0.48   1.51
 2.73   1.41
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.04   0.03   0.05   0.04   0.10
        0.04
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 19.81  21.76  23.35  22.30  40.54   0.77   0.88   6.17
13.91  19.77
 Exhst NOX:  2.20   2.55   2.74   2.61   7.58   1.48   1.71  18.42
 1.30   2.63

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
```

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 Exhst   HC:  1.29    1.63    1.80    1.69    1.49    0.32    0.45    1.41
 2.65   1.33
 Evap.   HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.03    0.03    0.04    0.03    0.08
         0.03
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst   CO: 18.95   21.09   22.49   21.56   41.42    0.76    0.86    6.07
12.99  18.97
 Exhst NOX:  2.33    2.69    2.90    2.76    7.86    1.62    1.88   20.15
 1.38   2.80

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes         Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
______  ______
 Veh. Spd.: 50.0    50.0    50.0            50.0    50.0    50.0    50.0
 50.0
   VMT Mix:  0.836   0.074   0.038           0.012   0.012   0.001   0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  1.68    2.11    2.39    2.20    2.61    0.31    0.44    1.40
 3.36   1.74
 Exhst   HC:  1.29    1.63    1.80    1.69    1.47    0.31    0.44    1.40
 2.65   1.33
 Evap.   HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.16
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.03    0.03    0.04    0.03    0.08
         0.03
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst   CO: 18.95   21.09   22.49   21.56   41.88    0.76    0.86    6.08
12.99  18.97
 Exhst NOX:  2.42    2.80    3.02    2.87    7.92    1.66    1.92   20.61
 1.42   2.91

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 51.0   51.0   51.0          51.0   51.0   51.0   51.0
 51.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.20   2.59   0.31   0.44   1.38
 3.36   1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.45   0.31   0.44   1.38
 2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.04   0.03   0.08
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.56  42.43   0.76   0.87   6.10
12.99  18.98
 Exhst NOX:  2.52   2.90   3.14   2.98   7.97   1.70   1.96  21.10
 1.46   3.01

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                         I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 52.0   52.0   52.0          52.0   52.0   52.0   52.0
 52.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.20   2.57   0.31   0.43   1.37
3.36    1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.43   0.31   0.43   1.37
2.65    1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
 0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.03   0.03   0.07
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
 0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.56  43.08   0.76   0.87   6.14
12.99  18.99
 Exhst NOX:  2.62   3.01   3.26   3.10   8.03   1.74   2.01  21.64
 1.51   3.12

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 53.0   53.0   53.0          53.0   53.0   53.0   53.0
 53.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.20   2.55   0.30   0.43   1.36
3.36    1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.42   0.30   0.43   1.36
2.65    1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
 0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.03   0.03   0.03   0.07
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
 0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.56  43.85   0.77   0.88   6.18
12.99  19.00
 Exhst NOX:  2.72   3.12   3.38   3.21   8.08   1.79   2.07  22.22
 1.55   3.23

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 54.0   54.0   54.0          54.0   54.0   54.0   54.0
 54.0
   VMT Mix:  0.836  0.074  0.038         0.012  0.012  0.001  0.021
0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.67   2.11   2.39   2.20   2.54   0.30   0.43   1.35
 3.36   1.73
 Exhst  HC:  1.29   1.63   1.80   1.69   1.41   0.30   0.43   1.35
 2.65   1.33
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.16
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.03   0.02   0.03   0.03   0.07
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.56  44.72   0.78   0.89   6.24
12.99  19.01
 Exhst NOX:  2.82   3.23   3.50   3.32   8.14   1.84   2.13  22.85
 1.60   3.34

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
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Ar C.4-9-12

```
    R4 MAJOR COLLECTOR MOBILE5a INPUTS CO WINTER 10/12/93
1              PROMPT - vertical flag input, no prompting
               MOBILE 5a CO 1990 Base Year Emissions Inv. (w/state age
dist. 1990)
1              TAMFLG - default tampering rates

1              SPDFLG - one speed per scenario
3              VMFLAG -             vehicle mix->state

3             MYMRFG - local registration and default mileage accrual
rates
1              NEWFLG - default exhaust emission rates

2              IMFLAG - include I/M program

1              ALHFLG - no additional correction factor inputs

1              ATPFLG - no anti-tampering program

1               RLFLAG - Stage II vapor recovery program not in Base
Year
2             LOCFLG - read in local area parameters one time for all
scenarios
1              TEMFLG - use max/min temps
4              OUTFMT - 80 column descriptive format

4                     PRTFLG   -   print   VOC,   CO,   and   NOx   values
[1-VOC,2-CO,3-NOx,4-all]
2              IDLFLG - print idle emissions results

3                NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4              HCFLAG - tot & comps HC

.744.127.065.020.010.002.027.005
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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AP C.4-10-1

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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1       .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
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Rt

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1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
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AP 6-4-10-3

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   R4 - MAJOR COLLECTOR
1         MOBILE 5a CO WINTER OUTPUT 1990 Base Year 10/12/93 Inv.
6/11/93 (w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):                   1983
     Pre-1981 MYR stringency rate:              12%
     First model year covered:                 1976
     Last model year covered:                  2020
     Waiver rate (pre-1981):                    1.%
     Waiver rate (1981 and newer):              1.%
     Compliance Rate:                          80.%
     Inspection type:                             Computerized Test and
Repair
     Inspection frequency                      Annual
     Vehicle types covered:                    LDGV - Yes
                                              LDGT1 - Yes
                                              LDGT2 - Yes
                                               HDGV - No
     1981 & later MYR test type:               Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)   Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5        Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0_________________________________________________________________
________________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix:  0.744  0.127  0.065        0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.77  24.81   1.43   2.01   6.35
26.75  19.00
 Exhst  HC: 16.35  17.16  20.45  18.27  18.56   1.43   2.01   6.35
26.05  16.36
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.17
 VOC    HC:  2.18    2.60    2.97    2.73    3.68    0.44    0.62    1.96
 4.12   2.30
 Exhst  HC:  1.75    2.10    2.35    2.18    2.47    0.44    0.62    1.96
 3.41   1.84
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.17
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.22
 Runing HC:  0.07    0.05    0.06    0.05    0.15
         0.07
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 24.08   25.76   27.97   26.51   48.19    0.96    1.10    7.73
19.64  24.29
 Exhst NOX:  2.12    2.43    2.62    2.50    6.92    1.38    1.60   17.15
 1.19   2.68
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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV   LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 33.0   33.0   33.0           33.0   33.0   33.0   33.0
 33.0
   VMT Mix:  0.744  0.127  0.065          0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.13    2.55    2.91    2.67    3.57    0.43    0.61    1.91
 4.04   2.25
 Exhst  HC:  1.70    2.05    2.30    2.13    2.37    0.43    0.61    1.91
 3.33   1.80
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.17
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.22
 Runing HC:  0.07    0.05    0.06    0.05    0.14
         0.07
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 23.59   25.27   27.42   26.00   46.93    0.94    1.07    7.51
18.94  23.79
 Exhst NOX:  2.12    2.44    2.63    2.51    6.98    1.38    1.59   17.11
 1.20   2.69
 ______ ______
 Veh. Spd.: 35.0   35.0   35.0          35.0   35.0   35.0   35.0
 35.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.05   2.47   2.81   2.58   3.38   0.41   0.58   1.82
 3.89   2.16
 Exhst  HC:  1.62   1.97   2.20   2.05   2.18   0.41   0.58   1.82
 3.18   1.72
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.17
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.22
 Runing HC:  0.06   0.04   0.06   0.05   0.13
         0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 22.69  24.40  26.44  25.09  44.80   0.89   1.01   7.13
17.68  22.89
 Exhst NOX:  2.14   2.47   2.66   2.53   7.09   1.38   1.59  17.12
 1.23   2.70


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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes      Ambient Temp:  43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 36.0   36.0   36.0          36.0   36.0   36.0   36.0
 36.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.01   2.43   2.77   2.54   3.29   0.40   0.56   1.77
 3.82   2.12
 Exhst  HC:  1.59   1.93   2.15   2.01   2.10   0.40   0.56   1.77
 3.11   1.68
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.17
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.22
 Runing HC:  0.06   0.04   0.06   0.05   0.13
         0.06
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Ap C 4-10-6

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 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 22.29   24.00   25.99   24.68   43.92    0.87    0.99    6.97
17.12  22.48
 Exhst NOX:  2.14    2.48    2.67    2.54    7.14    1.38    1.60   17.16
 1.24   2.71

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 37.0   37.0   37.0           37.0   37.0   37.0   37.0
 37.0
   VMT Mix:  0.744  0.127  0.065          0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.97    2.39    2.72    2.50    3.21    0.39    0.55    1.73
 3.75   2.08
 Exhst  HC:  1.56    1.89    2.11    1.97    2.03    0.39    0.55    1.73
 3.04   1.64
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.17
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.22
 Runing HC:  0.06    0.04    0.05    0.05    0.12
        0.06
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 21.90   23.64   25.58   24.29   43.15    0.85    0.97    6.82
16.59  22.10
 Exhst NOX:  2.15    2.49    2.68    2.55    7.20    1.39    1.60   17.23
 1.25   2.72

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
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AP 2-4-10-7

```
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.17
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.22
 Runing HC:  0.05   0.04   0.05   0.04   0.12
         0.05
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 21.21  22.99  24.82  23.61  41.92   0.82   0.93   6.57
15.65  21.42
 Exhst NOX:  2.16   2.51   2.70   2.57   7.31   1.40   1.62  17.44
 1.26   2.74

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88   2.29   2.61   2.40   3.01   0.37   0.52   1.63
 3.59   1.98
 Exhst  HC:  1.47   1.80   2.00   1.87   1.83   0.37   0.52   1.63
 2.88   1.55
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.17
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.22
 Runing HC:  0.05   0.04   0.05   0.04   0.11
         0.05
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.89  22.70  24.49  23.30  41.46   0.80   0.92   6.46
15.23  21.11
 Exhst NOX:  2.17   2.51   2.71   2.58   7.36   1.42   1.64  17.58
 1.27   2.75

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0Emission factors are as of Jan. 1st of the indicated calendar
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0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.82    2.24    2.54    2.34    2.90    0.35    0.50    1.57
 3.51   1.93
 Exhst  HC:  1.41    1.75    1.94    1.81    1.73    0.35    0.50    1.57
 2.80   1.50
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.17
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.22
 Runing HC:  0.05    0.04    0.05    0.04    0.11
        0.04
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 20.32   22.19   23.88   22.76   40.82    0.78    0.89    6.29
14.51   20.55
 Exhst NOX:  2.18    2.53    2.72    2.60    7.47    1.44    1.67   17.94
 1.29   2.78

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990              Region: Low             Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:    43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC    All Veh
+           ______  ______  ______  ______  ______  ______  ______  ______
______ ______
 Veh. Spd.: 43.0    43.0    43.0            43.0    43.0    43.0    43.0
 43.0
   VMT Mix:  0.744  0.127   0.065           0.020   0.010   0.002   0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.79    2.21    2.52    2.32    2.85    0.35    0.49    1.54
 3.47   1.90
 Exhst  HC:  1.39    1.72    1.91    1.79    1.69    0.35    0.49    1.54
 2.76   1.47
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.17
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.22
 Runing HC:  0.04    0.04    0.05    0.04    0.10
        0.04
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 20.05   21.97   23.61   22.52   40.64    0.78    0.88    6.22
14.19   20.31
```

[illegible] c.w-10-9

```
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 48.0   48.0   48.0           48.0   48.0   48.0   48.0
 48.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.21   2.67   0.32   0.45   1.43
 3.36   1.79
 Exhst  HC:  1.29   1.63   1.80   1.69   1.51   0.32   0.45   1.43
 2.65   1.37
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.17
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.22
 Runing HC:  0.03   0.03   0.04   0.03   0.09
        0.03
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 18.95  21.09  22.49  21.56  41.07   0.76   0.86   6.06
12.99  19.30
 Exhst NOX:  2.23   2.58   2.78   2.65   7.81   1.59   1.84  19.74
 1.33   2.88

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 49.0   49.0   49.0           49.0   49.0   49.0   49.0
 49.0
   VMT Mix:  0.744  0.127  0.065         0.020  0.010  0.002  0.027
0.005
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.68   2.11   2.39   2.21   2.64   0.32   0.45   1.41
 3.36   1.79
```

```
   R5 MINOR COLLECTOR CO WINTER MOBILE5a INPUTS  10/12/93
1          PROMPT - vertical flag input, no prompting
           MOBILE 5a CO 1990 Base Year Emissions Inv.  (w/state age
dist. 1990)
1          TAMFLG - default tampering rates

1          SPDFLG - one speed per scenario
3          VMFLAG -          vehicle mix-state

3         MYMRFG - local registration and default mileage accrual
rates
1          NEWFLG - default exhaust emission rates

2          IMFLAG - include I/M program

1          ALHFLG - no additional correction factor inputs

1          ATPFLG - no anti-tampering program

1           RLFLAG - Stage II vapor recovery program not in Base
Year
2         LOCFLG - read in local area parameters one time for all
scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format

4                   PRTFLG  -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results

3             NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4          HCFLAG - tot & comps HC

.769.096.049.025.011.001.025.024
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                           - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                           - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                           - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                           - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                           - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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    R5 MINOR COLLECTOR OUTPUT
1            MOBILE 5a CO 1990 Base Year Emissions Inv. 10/12/93
(w/state age dis
 MOBILE5a (26-Mar-93)
0I/M program selected:

0    Start year (January 1):             1983
     Pre-1981 MYR stringency rate:        12%
     First model year covered:           1976
     Last model year covered:            2020
     Waiver rate (pre-1981):              1.%
     Waiver rate (1981 and newer):        1.%
     Compliance Rate:                    80.%
     Inspection type:                       Computerized Test and
Repair
     Inspection frequency                Annual
     Vehicle types covered:              LDGV - Yes
                                        LDGT1 - Yes
                                        LDGT2 - Yes
                                         HDGV - No
     1981 & later MYR test type:         Idle
     Cutpoints, HC:  220.000   CO:    1.200   NOx:  999.000
0MA Base 90 w/Reg
                     Minimum Temp: 35. (F)  Maximum Temp: 45. (F)
                     Period 1 RVP: 13.5       Period 2 RVP: 13.5
Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0________________________________________________________________
________________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No     Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.:  2.5    2.5    2.5           2.5    2.5    2.5    2.5
  2.5
   VMT Mix:  0.769  0.096  0.049        0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC: 19.08  19.43  23.37  20.76  24.81   1.43   2.01   6.35
26.75  19.12
 Exhst  HC: 16.35  17.16  20.45  18.27  18.56   1.43   2.01   6.35
26.05  16.49
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
```

```
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
R5______ ______
 Veh. Spd.: 31.0   31.0   31.0          31.0   31.0   31.0   31.0
 31.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.23   2.65   3.03   2.78   3.80   0.45   0.64   2.02
 4.21   2.37
 Exhst  HC:  1.79   2.15   2.41   2.24   2.58   0.45   0.64   2.02
 3.50   1.91
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.08   0.05   0.07   0.06   0.15
        0.07
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 24.60  26.28  28.54  27.04  49.59   0.99   1.13   7.97
20.38   24.78
 Exhst NOX:  2.11   2.42   2.61   2.48   6.87   1.39   1.60  17.20
 1.17   2.63

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 32.0   32.0   32.0          32.0   32.0   32.0   32.0
 32.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
```

```
 VOC    HC:  2.18    2.60    2.97    2.73    3.68    0.44    0.62    1.96
 4.12   2.32
 Exhst  HC:  1.75    2.10    2.35    2.18    2.47    0.44    0.62    1.96
 3.41   1.86
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.18
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.07    0.05    0.06    0.05    0.15
         0.07
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 24.08   25.76   27.97   26.51   48.19    0.96    1.10    7.73
19.64   24.24
 Exhst NOX:  2.12    2.43    2.62    2.50    6.92    1.38    1.60   17.15
 1.19   2.64

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 33.0   33.0   33.0          33.0   33.0   33.0   33.0
 33.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.13    2.55    2.91    2.67    3.57    0.43    0.61    1.91
 4.04   2.27
 Exhst  HC:  1.70    2.05    2.30    2.13    2.37    0.43    0.61    1.91
 3.33   1.81
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.18
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.07    0.05    0.06    0.05    0.14
         0.07
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 23.59   25.27   27.42   26.00   46.93    0.94    1.07    7.51
18.94   23.74
 Exhst NOX:  2.12    2.44    2.63    2.51    6.98    1.38    1.59   17.11
 1.20   2.64
 VOC    HC:  2.18   2.60   2.97   2.73   3.68   0.44   0.62   1.96
 4.12   2.32
 Exhst  HC:  1.75   2.10   2.35   2.18   2.47   0.44   0.62   1.96
 3.41   1.86
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.15
        0.07
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 24.08  25.76  27.97  26.51  48.19   0.96   1.10   7.73
19.64  24.24
 Exhst NOX:  2.12   2.43   2.62   2.50   6.92   1.38   1.60  17.15
 1.19   2.64

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes       Ambient Temp:  43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:  20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 33.0   33.0   33.0          33.0   33.0   33.0   33.0
 33.0
   VMT Mix:  0.769  0.096  0.049        0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.13   2.55   2.91   2.67   3.57   0.43   0.61   1.91
 4.04   2.27
 Exhst  HC:  1.70   2.05   2.30   2.13   2.37   0.43   0.61   1.91
 3.33   1.81
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.14
        0.07
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 23.59  25.27  27.42  26.00  46.93   0.94   1.07   7.51
18.94  23.74
 Exhst NOX:  2.12   2.44   2.63   2.51   6.98   1.38   1.59  17.11
 1.20   2.64
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C-4-11-5

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_______________R5
0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09   2.51   2.86   2.63   3.47   0.42   0.59   1.86
 3.96   2.22
 Exhst  HC:  1.66   2.01   2.25   2.09   2.27   0.42   0.59   1.86
 3.25   1.77
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.14
        0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 23.13  24.82  26.92  25.53  45.80   0.91   1.04   7.31
18.29  23.26
 Exhst NOX:  2.13   2.46   2.64   2.52   7.03   1.38   1.59  17.11
 1.21   2.65


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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
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 ______ ______R5
 Veh. Spd.: 35.0    35.0    35.0             35.0    35.0    35.0    35.0
 35.0
   VMT Mix:  0.769  0.096  0.049            0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  2.05    2.47    2.81    2.58    3.38    0.41    0.58    1.82
 3.89    2.18
 Exhst   HC:  1.62    1.97    2.20    2.05    2.18    0.41    0.58    1.82
 3.18    1.73
 Evap.   HC:  0.15    0.19    0.29    0.22    0.61
  0.71    0.18
 Refuel  HC:  0.21    0.27    0.27    0.27    0.45
          0.21
 Runing  HC:  0.06    0.04    0.06    0.05    0.13
          0.06
 Rsting  HC:  0.00    0.00    0.00    0.00    0.00
  0.00    0.00
 Exhst   CO: 22.69   24.40   26.44   25.09   44.80    0.89    1.01    7.13
17.68   22.82
 Exhst  NOX:  2.14    2.47    2.66    2.53    7.09    1.38    1.59   17.12
 1.23    2.66


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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
 ______ ______
 Veh. Spd.: 36.0    36.0    36.0             36.0    36.0    36.0    36.0
 36.0
   VMT Mix:  0.769  0.096  0.049            0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  2.01    2.43    2.77    2.54    3.29    0.40    0.56    1.77
 3.82    2.14
 Exhst   HC:  1.59    1.93    2.15    2.01    2.10    0.40    0.56    1.77
 3.11    1.69
 Evap.   HC:  0.15    0.19    0.29    0.22    0.61
  0.71    0.18
 Refuel  HC:  0.21    0.27    0.27    0.27    0.45
          0.21
 Runing  HC:  0.06    0.04    0.06    0.05    0.13
          0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 22.29  24.00  25.99  24.68  43.92   0.87   0.99   6.97
17.12  22.41
 Exhst NOX:  2.14   2.48   2.67   2.54   7.14   1.38   1.60  17.16
 1.24   2.67

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 37.0   37.0   37.0          37.0   37.0   37.0   37.0
 37.0
   VMT Mix:  0.769  0.096  0.049        0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.97   2.39   2.72   2.50   3.21   0.39   0.55   1.73
 3.75   2.10
 Exhst  HC:  1.56   1.89   2.11   1.97   2.03   0.39   0.55   1.73
 3.04   1.65
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.06   0.04   0.05   0.05   0.12
        0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 21.90  23.64  25.58  24.29  43.15   0.85   0.97   6.82
16.59  22.02
 Exhst NOX:  2.15   2.49   2.68   2.55   7.20   1.39   1.60  17.23
 1.25   2.68

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes      Ambient Temp:   43.0
/ 43.0 / 43.0 F
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                         Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                          Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 38.0   38.0   38.0            38.0    38.0    38.0    38.0
 38.0
   VMT Mix:  0.769  0.096  0.049           0.025   0.011   0.001   0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.94   2.35   2.68   2.47    3.14    0.38    0.54    1.70
 3.69   2.06
 Exhst  HC:  1.52   1.86   2.07   1.93    1.96    0.38    0.54    1.70
 2.99   1.62
 Evap.  HC:  0.15   0.19   0.29   0.22    0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27    0.45
        0.21
 Runing HC:  0.06   0.04   0.05   0.04    0.12
        0.05
 Rsting HC:  0.00   0.00   0.00   0.00    0.00
  0.00   0.00
 Exhst  CO: 21.55  23.30  25.19  23.94   42.49    0.83    0.95    6.68
16.10  21.66
 Exhst NOX:  2.16   2.50   2.69   2.56    7.25    1.39    1.61   17.32
 1.26   2.69

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low            Altitude:  500.
Ft.
                          I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                         Anti-tam. Program: No       Operating Mode:    20.6
/ 27.3 / 20.6
                          Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 39.0   39.0   39.0            39.0    39.0    39.0    39.0
 39.0
   VMT Mix:  0.769  0.096  0.049           0.025   0.011   0.001   0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.91   2.32   2.64   2.43    3.07    0.37    0.53    1.66
 3.64   2.03
 Exhst  HC:  1.49   1.83   2.04   1.90    1.89    0.37    0.53    1.66
 2.93   1.59
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.05   0.04   0.05   0.04   0.12
         0.05
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 21.21  22.99  24.82  23.61  41.92   0.82   0.93   6.57
15.65  21.33
 Exhst NOX:  2.16   2.51   2.70   2.57   7.31   1.40   1.62  17.44
 1.26   2.70

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No       Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0
 40.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.88   2.29   2.61   2.40   3.01   0.37   0.52   1.63
3.59   2.00
 Exhst  HC:  1.47   1.80   2.00   1.87   1.83   0.37   0.52   1.63
2.88   1.56
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.05   0.04   0.05   0.04   0.11
         0.05
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 20.89  22.70  24.49  23.30  41.46   0.80   0.92   6.46
15.23  21.02
 Exhst NOX:  2.17   2.51   2.71   2.58   7.36   1.42   1.64  17.58
 1.27   2.71

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
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     R6  LOCAL  MOBILE5a INPUTS CO WINTER 10/12/93
1              PROMPT - vertical flag input, no prompting
               MOBILE 5a CO 1990 Base Year Emissions Inv. (w/state age
dist. 1990)
1              TAMFLG - default tampering rates

1              SPDFLG - one speed per scenario
3              VMFLAG -             vehicle mix-state

3             MYMRFG - local registration and default mileage accrual
rates
1              NEWFLG - default exhaust emission rates

2              IMFLAG - include I/M program

1              ALHFLG - no additional correction factor inputs

1              ATPFLG - no anti-tampering program

1               RLFLAG - Stage II vapor recovery program not in Base
Year
2             LOCFLG - read in local area parameters one time for all
scenarios
1              TEMFLG - use max/min temps
4              OUTFMT - 80 column descriptive format

4                       PRTFLG   -  print  VOC,  CO,  and  NOx  values
[1-VOC,2-CO,3-NOx,4-all]
2              IDLFLG - print idle emissions results

3                NMHFLG - print VOC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG,
5-NMOG]
4              HCFLAG - tot & comps HC

.769.096.049.025.011.001.025.024
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age ldgv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age ldgv
.003 .002 .002 .001 .008                          - 21-25 age ldgv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt1
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt1
.003 .002 .002 .001 .007                          - 11-20 age ldgt1
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age ldgt2
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age ldgt2
.003 .002 .002 .001 .007                          - 11-20 age ldgt2
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hdgv

.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hdgv

.010 .007 .008 .006 .021                          - 21-25 age hdgv
.029 .064 .078 .094 .108 .111 .108 .093 .079 .053 - 1-10 age lddv
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003 - 11-20 age lddv

.003 .002 .002 .001 .008                          - 21-25 age lddv
.033 .080 .086 .116 .139 .134 .102 .070 .055 .036 - 1-10 age lddt
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.024 .018 .014 .026 .020 .013 .007 .004 .004 .004 - 11-20 age lddt
.003 .002 .002 .001 .007                          - 21-25 age lddt
.022 .050 .071 .112 .135 .131 .109 .065 .046 .027 - 1-10 age hddv
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014 - 11-20 age hddv

.010 .007 .008 .006 .021                            21-25 age hddv

.023 .054 .054 .063 .061 .068 .097 .079 .052 .062 - 1-10 age mc
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000 - 11-12 age mc
.000 .000 .000 .000 .000                          - blank record mc
83 12 76 20 01 01 080 2 1 2221 1 11                 .I/M data
MA Base 90 w/Reg  0003500045013.5013.5 89 1 1       .LAP record
1 90 02.5 40.0 20.6 27.3 20.6
1 90 03.0 40.0 20.6 27.3 20.6
1 90 04.0 40.0 20.6 27.3 20.6
1 90 05.0 40.0 20.6 27.3 20.6
1 90 06.0 40.0 20.6 27.3 20.6
1 90 07.0 40.0 20.6 27.3 20.6
1 90 08.0 40.0 20.6 27.3 20.6
1 90 09.0 40.0 20.6 27.3 20.6
1 90 10.0 40.0 20.6 27.3 20.6
1 90 11.0 40.0 20.6 27.3 20.6
1 90 12.0 40.0 20.6 27.3 20.6
1 90 13.0 40.0 20.6 27.3 20.6
1 90 14.0 40.0 20.6 27.3 20.6
1 90 15.0 40.0 20.6 27.3 20.6
1 90 16.0 40.0 20.6 27.3 20.6
1 90 17.0 40.0 20.6 27.3 20.6
1 90 18.0 40.0 20.6 27.3 20.6
1 90 19.0 40.0 20.6 27.3 20.6
1 90 20.0 40.0 20.6 27.3 20.6
1 90 21.0 40.0 20.6 27.3 20.6
1 90 22.0 40.0 20.6 27.3 20.6
1 90 23.0 40.0 20.6 27.3 20.6
1 90 24.0 40.0 20.6 27.3 20.6
1 90 25.0 40.0 20.6 27.3 20.6
1 90 26.0 40.0 20.6 27.3 20.6
1 90 27.0 40.0 20.6 27.3 20.6
1 90 28.0 40.0 20.6 27.3 20.6
1 90 29.0 40.0 20.6 27.3 20.6
1 90 30.0 40.0 20.6 27.3 20.6
1 90 31.0 40.0 20.6 27.3 20.6
1 90 32.0 40.0 20.6 27.3 20.6
1 90 33.0 40.0 20.6 27.3 20.6
1 90 34.0 40.0 20.6 27.3 20.6
1 90 35.0 40.0 20.6 27.3 20.6
1 90 36.0 40.0 20.6 27.3 20.6
1 90 37.0 40.0 20.6 27.3 20.6
1 90 38.0 40.0 20.6 27.3 20.6
1 90 39.0 40.0 20.6 27.3 20.6
1 90 40.0 40.0 20.6 27.3 20.6
1 90 41.0 40.0 20.6 27.3 20.6
1 90 42.0 40.0 20.6 27.3 20.6
1 90 43.0 40.0 20.6 27.3 20.6
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1 90 44.0 40.0 20.6 27.3 20.6
1 90 45.0 40.0 20.6 27.3 20.6
1 90 46.0 40.0 20.6 27.3 20.6
1 90 47.0 40.0 20.6 27.3 20.6
1 90 48.0 40.0 20.6 27.3 20.6
1 90 49.0 40.0 20.6 27.3 20.6
1 90 50.0 40.0 20.6 27.3 20.6
1 90 51.0 40.0 20.6 27.3 20.6
1 90 52.0 40.0 20.6 27.3 20.6
1 90 53.0 40.0 20.6 27.3 20.6
1 90 54.0 40.0 20.6 27.3 20.6
1 90 55.0 40.0 20.6 27.3 20.6
1 90 56.0 40.0 20.6 27.3 20.6
1 90 57.0 40.0 20.6 27.3 20.6
1 90 58.0 40.0 20.6 27.3 20.6
1 90 59.0 40.0 20.6 27.3 20.6
1 90 60.0 40.0 20.6 27.3 20.6
1 90 61.1 40.0 20.6 27.3 20.6
1 90 62.0 40.0 20.6 27.3 20.6
1 90 63.0 40.0 20.6 27.3 20.6
1 90 64.0 40.0 20.6 27.3 20.6
1 90 65.0 40.0 20.6 27.3 20.6
```

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```
 Runing HC:  0.14    0.09    0.11    0.09    0.26
        0.12
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 34.98  36.04  39.78  37.30  83.09    1.65    1.89  13.28
34.12  35.55
 Exhst NOX:  2.02    2.19    2.38    2.26    6.21    1.61    1.86  19.99
 0.94   2.57

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 20.0   20.0   20.0          20.0   20.0   20.0   20.0
 20.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  3.06    3.51    4.02    3.68    6.02    0.65    0.91    2.89
 5.55   3.25
 Exhst  HC:  2.58    2.98    3.36    3.11    4.71    0.65    0.91    2.89
 4.84   2.75
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.18
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.12    0.08    0.10    0.09    0.24
        0.11
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 33.58  34.84  38.35  36.03  78.63    1.57    1.79  12.60
32.42  34.13
 Exhst NOX:  2.02    2.20    2.39    2.26    6.26    1.58    1.82  19.58
 0.96   2.57

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
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 Exhst  HC:  2.38   2.77   3.12   2.89   4.16   0.60   0.85   2.68
 4.53   2.54
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.11   0.07   0.09   0.08   0.22
        0.10
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 31.33  32.77  35.90  33.83  70.89   1.42   1.62  11.41
29.47  31.78
 Exhst NOX:  2.04   2.25   2.44   2.32   6.37   1.52   1.76  18.88
 1.00   2.58

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 23.0   23.0   23.0          23.0   23.0   23.0   23.0
 23.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.76   3.20   3.66   3.36   5.19   0.58   0.82   2.59
 5.09   2.93
 Exhst  HC:  2.30   2.68   3.02   2.80   3.92   0.58   0.82   2.59
 4.39   2.45
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.11   0.07   0.09   0.08   0.21
        0.10
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 30.34  31.85  34.83  32.85  67.54   1.36   1.55  10.88
28.17  30.75
 Exhst NOX:  2.05   2.28   2.46   2.34   6.43   1.50   1.73  18.58
 1.02   2.58

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 25.0 SPEED R6
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.60   3.04   3.47   3.18   4.75   0.54   0.77   2.42
 4.84   2.76
 Exhst  HC:  2.14   2.52   2.83   2.63   3.50   0.54   0.77   2.42
 4.13   2.28
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.10   0.06   0.08   0.07   0.19
         0.09
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 28.59  30.18  32.92  31.11  61.70   1.24   1.42   9.96
25.84  28.92
 Exhst NOX:  2.06   2.32   2.51   2.38   6.54   1.46   1.68  18.07
 1.06   2.59

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990          Region: Low           Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+          ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 26.0   26.0   26.0          26.0   26.0   26.0   26.0
 26.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.53   2.96   3.38   3.10   4.56   0.53   0.74   2.34
 4.72   2.69
 Exhst  HC:  2.07   2.45   2.75   2.55   3.31   0.53   0.74   2.34
 4.01   2.21
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.09   0.06   0.08   0.07   0.18
         0.09
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
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  Exhst  CO: 27.80  29.43  32.06  30.32  59.17   1.19   1.36   9.55
24.79  28.10
  Exhst NOX:  2.07   2.34   2.53   2.40   6.59   1.44   1.66  17.86
  1.08   2.60

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 27.0   27.0   27.0           27.0   27.0   27.0   27.0
 27.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.46   2.89   3.30   3.03   4.38   0.51   0.72   2.27
 4.61   2.61
 Exhst  HC:  2.01   2.38   2.67   2.48   3.14   0.51   0.72   2.27
 3.90   2.14
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.09   0.06   0.08   0.06   0.18
         0.08
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 27.07  28.72  31.26  29.58  56.86   1.14   1.31   9.18
23.80  27.34
 Exhst NOX:  2.08   2.36   2.54   2.42   6.65   1.42   1.64  17.68
 1.10   2.60

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low           Altitude:  500.
Ft.
                       I/M Program: Yes        Ambient Temp:   43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
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                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 28.0   28.0   28.0           28.0   28.0   28.0   28.0
 28.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.40   2.83   3.23   2.96   4.22   0.49   0.70   2.20
 4.50   2.55
 Exhst  HC:  1.95   2.32   2.60   2.41   2.98   0.49   0.70   2.20
 3.79   2.08
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.09   0.06   0.07   0.06   0.17
        0.08
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 26.39  28.05  30.52  28.88  54.77   1.10   1.26   8.84
22.87  26.64
 Exhst NOX:  2.09   2.37   2.56   2.44   6.70   1.41   1.63  17.52
 1.12   2.61

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:  43.0
/ 43.0 / 43.0 F
                  Anti-tam. Program: No      Operating Mode:  20.6
/ 27.3 / 20.6
                   Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 29.0   29.0   29.0           29.0   29.0   29.0   29.0
 29.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.34   2.76   3.16   2.90   4.07   0.48   0.68   2.14
 4.40   2.48
 Exhst  HC:  1.89   2.26   2.53   2.35   2.84   0.48   0.68   2.14
 3.69   2.02
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.08    0.05    0.07    0.06    0.16
        0.08
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 25.76   27.42   29.82   28.23   52.87    1.06    1.21    8.53
21.99   25.98
 Exhst NOX:  2.10    2.39    2.58    2.45    6.76    1.40    1.62   17.39
 1.14    2.62

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990           Region: Low          Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                 Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 30.0   30.0   30.0          30.0   30.0   30.0   30.0
 30.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.28    2.71    3.09    2.84    3.93    0.47    0.66    2.07
 4.30   2.42
 Exhst  HC:  1.84    2.20    2.47    2.29    2.71    0.47    0.66    2.07
 3.60   1.96
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.18
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
        0.21
 Runing HC:  0.08    0.05    0.07    0.06    0.16
        0.07
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 25.16   26.83   29.16   27.62   51.15    1.03    1.17    8.24
21.16   25.36
 Exhst NOX:  2.10    2.40    2.59    2.47    6.81    1.39    1.61   17.28
 1.15    2.62

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
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0Cal. Year: 1990             Region: Low             Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 31.0   31.0   31.0          31.0   31.0   31.0   31.0
 31.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.23   2.65   3.03   2.78   3.80   0.45   0.64   2.02
 4.21   2.37
 Exhst  HC:  1.79   2.15   2.41   2.24   2.58   0.45   0.64   2.02
 3.50   1.91
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.08   0.05   0.07   0.06   0.15
        0.07
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 24.60  26.28  28.54  27.04  49.59   0.99   1.13   7.97
20.38  24.78
 Exhst NOX:  2.11   2.42   2.61   2.48   6.87   1.39   1.60  17.20
 1.17   2.63

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low             Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                    Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                     Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 32.0   32.0   32.0          32.0   32.0   32.0   32.0
 32.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
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C 4-12-10

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
_____ _____
 Veh. Spd.: 34.0   34.0   34.0          34.0   34.0   34.0   34.0
 34.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.09   2.51   2.86   2.63   3.47   0.42   0.59   1.86
 3.96   2.22
 Exhst  HC:  1.66   2.01   2.25   2.09   2.27   0.42   0.59   1.86
 3.25   1.77
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
        0.21
 Runing HC:  0.07   0.05   0.06   0.05   0.14
        0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 23.13  24.82  26.92  25.53  45.80   0.91   1.04   7.31
18.29   23.26
 Exhst NOX:  2.13   2.46   2.64   2.52   7.03   1.38   1.59  17.11
 1.21   2.65

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0Emission  factors  are  as  of  Jan.  1st  of  the  indicated  calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                        I/M Program: Yes       Ambient Temp:   43.0
/ 43.0 / 43.0 F
                   Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                    Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
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 ______ ______
 Veh. Spd.: 35.0   35.0   35.0          35.0   35.0   35.0   35.0
 35.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.05   2.47   2.81   2.58   3.38   0.41   0.58   1.82
3.89   2.18
 Exhst  HC:  1.62   1.97   2.20   2.05   2.18   0.41   0.58   1.82
3.18   1.73
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.06   0.04   0.06   0.05   0.13
         0.06
 Rsting HC:  0.00   0.00   0.00   0.00   0.00
  0.00   0.00
 Exhst  CO: 22.69  24.40  26.44  25.09  44.80   0.89   1.01   7.13
17.68  22.82
 Exhst NOX:  2.14   2.47   2.66   2.53   7.09   1.38   1.59  17.12
 1.23   2.66

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0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990            Region: Low            Altitude:  500.
Ft.
                      I/M Program: Yes       Ambient Temp:  43.0
/ 43.0 / 43.0 F
                Anti-tam. Program: No      Operating Mode:   20.6
/ 27.3 / 20.6
                Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 36.0   36.0   36.0          36.0   36.0   36.0   36.0
 36.0
   VMT Mix:  0.769  0.096  0.049         0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.01   2.43   2.77   2.54   3.29   0.40   0.56   1.77
3.82   2.14
 Exhst  HC:  1.59   1.93   2.15   2.01   2.10   0.40   0.56   1.77
3.11   1.69
 Evap.  HC:  0.15   0.19   0.29   0.22   0.61
  0.71   0.18
 Refuel HC:  0.21   0.27   0.27   0.27   0.45
         0.21
 Runing HC:  0.06   0.04   0.06   0.05   0.13
         0.06
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 22.29   24.00   25.99   24.68   43.92    0.87    0.99    6.97
17.12  22.41
 Exhst NOX:  2.14    2.48    2.67    2.54    7.14    1.38    1.60   17.16
 1.24   2.67
_____________________________________________________________________________
_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes         Ambient Temp:   43.0
/ 43.0 / 43.0 F
                 Anti-tam. Program: No        Operating Mode:   20.6
/ 27.3 / 20.6
                  Reformulated Gas: No
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV
 MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______
______ ______
 Veh. Spd.: 37.0    37.0    37.0            37.0    37.0    37.0    37.0
 37.0
   VMT Mix:  0.769  0.096  0.049            0.025  0.011  0.001  0.025
0.024
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.97    2.39    2.72    2.50    3.21    0.39    0.55    1.73
 3.75   2.10
 Exhst  HC:  1.56    1.89    2.11    1.97    2.03    0.39    0.55    1.73
 3.04   1.65
 Evap.  HC:  0.15    0.19    0.29    0.22    0.61
  0.71   0.18
 Refuel HC:  0.21    0.27    0.27    0.27    0.45
         0.21
 Runing HC:  0.06    0.04    0.05    0.05    0.12
         0.06
 Rsting HC:  0.00    0.00    0.00    0.00    0.00
  0.00   0.00
 Exhst  CO: 21.90   23.64   25.58   24.29   43.15    0.85    0.97    6.82
16.59  22.02
 Exhst NOX:  2.15    2.49    2.68    2.55    7.20    1.39    1.60   17.23
 1.25   2.68
_____________________________________________________________________________
_______________
0Emission factors are as of Jan. 1st of the indicated calendar
year.
0User supplied veh registration distributions.
0Cal. Year: 1990             Region: Low            Altitude:  500.
Ft.
                       I/M Program: Yes         Ambient Temp:   43.0
/ 43.0 / 43.0 F
```

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APPENDIX C.5

CTPS DATA AND DOCUMENTATION

CTPS

APPENDIX C.5

State Transportation Building
Ten Park Plaza, Suite 2150
Boston, MA 02116-3968
(617) 973-7100
Fax: (617) 973-8855

**CENTRAL
TRANSPORTATION
PLANNING
STAFF**

September 22, 1993

Ms. Christine Kirby
Massachusetts Department of Environmental Protection
1 Winter Street
Boston, Massachusetts 02108

Dear Ms. Kirby:

As requested, Central Transportation Planning Staff (CTPS) is submitting the methodology used in determining vehicle age distribution for Massachusetts to be used as inputs to then MOBILE 4.1 for determining emission factors for motor vehicles. This information can also be used for the updated version, MOBILE 5A.

In the Spring of 1992, CTPS derived vehicle age distributions for Massachusetts and its regional planning areas, and attempted to establish vehicle miles traveled (VMT) mixes for these areas. The vehicle age distribution data was compiled and this information is included. Because of lack of information at the time, the VMT mix information was not completed, and the default VMT mix was used in our analyses. However, just recently the VMT mix information has been made available . This information was transmitted to DEP in a letter from Daniel Beagan, Bureau of Transportation Planning & Development, EOTC, dated September 17, 1993.

The methodology and assumptions for developing the vehicle age distribution is as follows. State-wide and local age distributions were developed from Massachusetts Registry of Motor Vehicles 1992 data. The EPA guide, "Techniques for Estimating MOBILE 2 Variables," July 1980, describes two different methods to localize national data. It mentions that "the techniques described are not considered 'better' than any other estimation technique." The guidance also mentions the wide variation in registration data collection among states. We felt that Massachusetts Registry data was reliable enough to serve as the basis for the state and local age distributions.

The Registry information was divided into four categories:

- Automobiles
- Motorcycles
- Light Duty Trucks (less than or equal to 8000 pounds)
- Heavy Duty Trucks (greater than 8000 pounds)

The only assumption made in terms of the Registry data was that non-commercially registered trucks were distributed in the same proportion as those of commercial trucks. This was due to lack of data on the weight of non-commercially registered trucks.

The Registry data did not distinguish between vehicle fuel types. As required in the MOBILE Manual, the age distribution for Light Duty Gas Vehicles and Light Duty Diesel Vehicles must be the same. MOBILE uses an internal function to separate these pairs of vehicle types into distinct gas and diesel distribution, based on diesel sales fractions by model year. Because of lack of data distinguishing between Light Duty Gas Trucks 1 and Light Duty Gas Trucks 2, we grouped all three Light Duty Trucks together (LDGT1, LDGT2, & LDDT). It was not possible to distinguish between Heavy Duty Diesel Vehicles and Heavy Duty Gas Vehicles, so these categories were also grouped together.

As required by the MOBILE Manual, motorcycles distribution was provided for the first to the 12th and later years of operation.

Enclosed are the computer readable input files for both CO and VOC that include the new age distribution. Also enclosed is a chart showing the comparison of the Massachusetts specific age distribution to the national MOBILE default distribution.

If you have any questions, please don't hesitate to call.

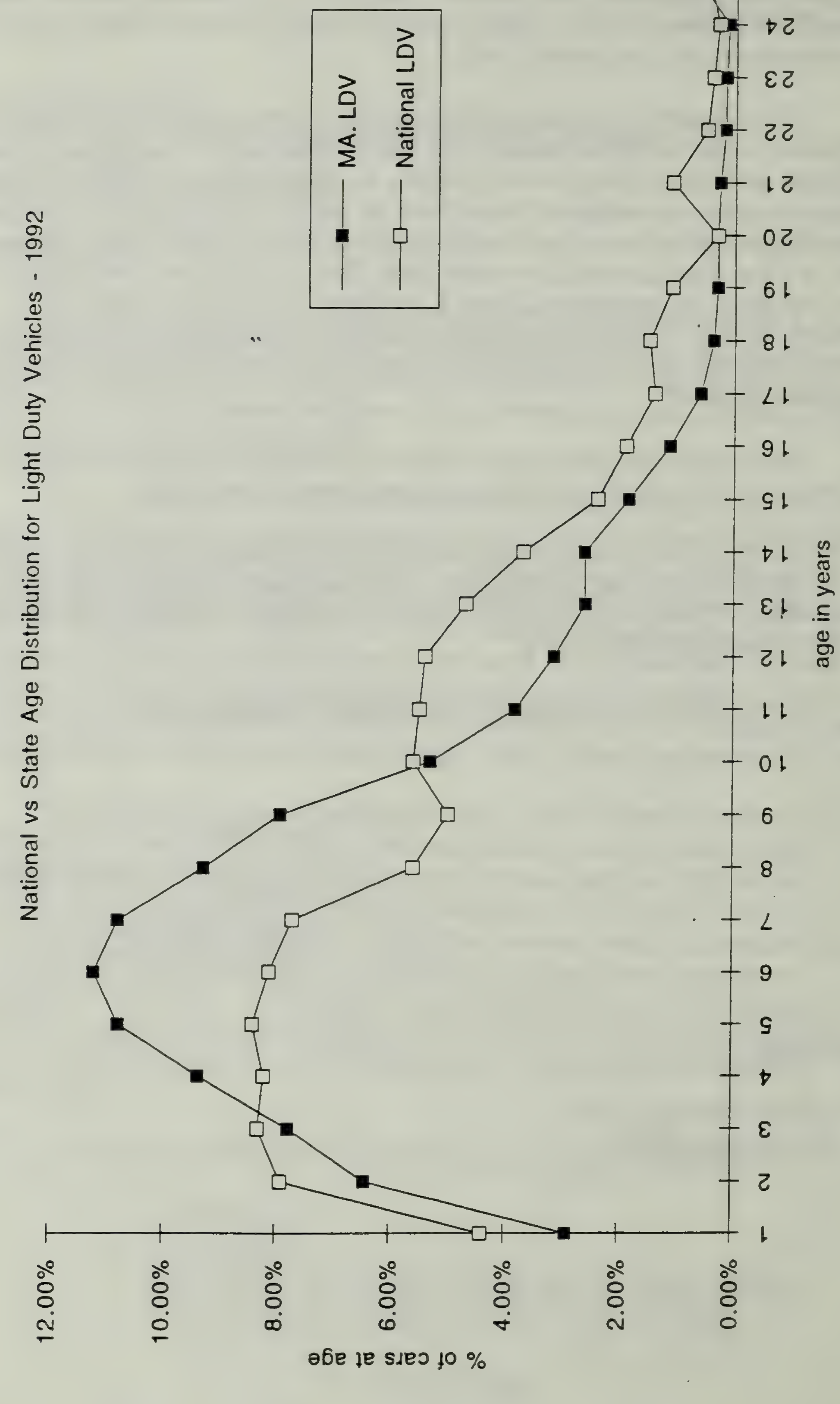
Sincerely,

Anne S. McGahan

Anne S. McGahan
Certification Activities

ASM/asm

cc: Arnie Soolman, CTPS
Dan Beagan, EOTC


National vs State Age Distribution for Light Duty Vehicles - 1992

```
1          PROMPT - vertical flag input, no prompting
      MOBILE4.1 VOCs 1992 (w/state age distribution)
1          TAMFLG - default tampering rates
1          SPDFLG - one speed per scenario
1          VMFLAG - default vehicle mix
3          MYMRFG - local registration and default mileage accrual rates
1          NEWFLG - default exhaust emission rates
2          IMFLAG - include I/M program
1          ALHFLG - no additional correction factor inputs
1          ATPFLG - no anti-tampering program
2          RLFLAG - include stage II vapor recovery pogram
2          LOCFLG - read in local area parameters one time for all scenarios
1          TEMFLG - use max/min temps
4          OUTFMT - 80 column descriptive format
1          PRTFLG - print HC values only [2-CO,3-NOx,4-all]
2          IDLFLG - print idle emissions results
3          NMHFLG - print NMHC [3-VOCs, 1-THCs, 2-NMHC, 4-TOG, 5-NMOG]
2          HCFLAG - tot & comps HC [1-sun of all HC 3-comp,totals,break]
.029 .064 .078 .094 .108 .112 .108 .093 .079 .053   .LDGV ages 1-10
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003   .LDGV ages 11-20
.003 .002 .002 .001 .008                            .LDGV ages 21-25
.033 .080 .086 .116 .140 .134 .102 .070 .055 .036   .LDGT1 ages 1-10
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004   .LDGT1 ages 11-20
.003 .002 .002 .001 .007                            .LDGT1 ages 21-25
.033 .080 .086 .116 .140 .134 .102 .070 .055 .036   .LDGT2 ages 1-10
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004   .LDGT2 ages 11-20
.003 .002 .002 .001 .007                            .LDGT2 ages 21-25
.022 .050 .071 .112 .134 .131 .109 .065 .046 .027   .HDGV age 1-10
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014   .HDGV age 11-20
.010 .007 .008 .006 .021                            .HDGV age 21-25
.029 .064 .078 .094 .108 .112 .108 .093 .079 .053   .LDDV age 1-10
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003   .LDDV age 11-20
.003 .002 .002 .001 .008                            .LDDV age 21-25
.033 .080 .086 .116 .140 .134 .102 .070 .055 .036   .LDDT age 1-10
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004   .LDDT age 11-20
.003 .002 .002 .001 .007                            .LDDT age 21-25
.022 .050 .071 .112 .134 .131 .109 .065 .046 .027   .HDDV age 1-10
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014   .HDDV age 11-20
.010 .007 .008 .006 .021                            .HDDV age 21-25
.023 .054 .054 .063 .061 .068 .096 .079 .052 .062   .MC age 1-10
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000   .MC age 11 & 12
.000 .000 .000 .000 .000                            .MC blank record
83 12 78 20 1. 1. 085 2 1 2221 1 11                .I/M data
91 3 095 095                                       .Stage II VRP data
CTPS.mfg       MA C  68.  94. 11.5  9.0 89 1 1     .LAP record
1 92  3.0 85.4 20.6 27.3 20.6
1 92  4.0 85.4 20.6 27.3 20.6
1 92  5.0 85.4 20.6 27.3 20.6
1 92  6.0 85.4 20.6 27.3 20.6
1 92  7.0 85.4 20.6 27.3 20.6
1 92  8.0 85.4 20.6 27.3 20.6
1 92  9.0 85.4 20.6 27.3 20.6
1 92 10.0 85.4 20.6 27.3 20.6
1 92 11.0 85.4 20.6 27.3 20.6
1 92 12.0 85.4 20.6 27.3 20.6
1 92 13.0 85.4 20.6 27.3 20.6
1 92 14.0 85.4 20.6 27.3 20.6
1 92 15.0 85.4 20.6 27.3 20.6
```

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1 92 16.0 85.4 20.6 27.3 20.6
1 92 17.0 85.4 20.6 27.3 20.6
1 92 18.0 85.4 20.6 27.3 20.6
1 92 19.0 85.4 20.6 27.3 20.6
1 92 20.0 85.4 20.6 27.3 20.6
1 92 21.0 85.4 20.6 27.3 20.6
1 92 22.0 85.4 20.6 27.3 20.6
1 92 23.0 85.4 20.6 27.3 20.6
1 92 24.0 85.4 20.6 27.3 20.6
1 92 25.0 85.4 20.6 27.3 20.6
1 92 26.0 85.4 20.6 27.3 20.6
1 92 27.0 85.4 20.6 27.3 20.6
1 92 28.0 85.4 20.6 27.3 20.6
1 92 29.0 85.4 20.6 27.3 20.6
1 92 30.0 85.4 20.6 27.3 20.6
1 92 31.0 85.4 20.6 27.3 20.6
1 92 32.0 85.4 20.6 27.3 20.6
1 92 33.0 85.4 20.6 27.3 20.6
1 92 34.0 85.4 20.6 27.3 20.6
1 92 35.0 85.4 20.6 27.3 20.6
1 92 36.0 85.4 20.6 27.3 20.6
1 92 37.0 85.4 20.6 27.3 20.6
1 92 38.0 85.4 20.6 27.3 20.6
1 92 39.0 85.4 20.6 27.3 20.6
1 92 40.0 85.4 20.6 27.3 20.6
1 92 41.0 85.4 20.6 27.3 20.6
1 92 42.0 85.4 20.6 27.3 20.6
1 92 43.0 85.4 20.6 27.3 20.6
1 92 44.0 85.4 20.6 27.3 20.6
1 92 45.0 85.4 20.6 27.3 20.6
1 92 46.0 85.4 20.6 27.3 20.6
1 92 47.0 85.4 20.6 27.3 20.6
1 92 48.0 85.4 20.6 27.3 20.6
1 92 49.0 85.4 20.6 27.3 20.6
1 92 50.0 85.4 20.6 27.3 20.6
1 92 51.0 85.4 20.6 27.3 20.6
1 92 52.0 85.4 20.6 27.3 20.6
1 92 53.0 85.4 20.6 27.3 20.6
1 92 54.0 85.4 20.6 27.3 20.6
1 92 55.0 85.4 20.6 27.3 20.6
1 92 56.0 85.4 20.6 27.3 20.6
1 92 57.0 85.4 20.6 27.3 20.6
1 92 58.0 85.4 20.6 27.3 20.6
1 92 59.0 85.4 20.6 27.3 20.6
1 92 60.0 85.4 20.6 27.3 20.6
1 92 61.0 85.4 20.6 27.3 20.6
1 92 62.0 85.4 20.6 27.3 20.6
1 92 63.0 85.4 20.6 27.3 20.6
1 92 64.0 85.4 20.6 27.3 20.6
1 92 65.0 85.4 20.6 27.3 20.6
```

1

MOBILE4.1 VOCs 1992 (w/state age distribution)

```
 MOBILE4.1(4Nov91)
0
-M 49 Warning:
-                1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
+                1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
+                1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
+               0.999     MYR sum not = 1. (will normalize)
-M 49 Warning:
+                1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
+                1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
+               0.999     MYR sum not = 1. (will normalize)
-M 49 Warning:
+               0.999     MYR sum not = 1. (will normalize)
0I/M program selected:
0    Start year (January 1):             1983
     Pre-1981 MYR stringency rate:        12%
     First model year covered:           1978
     Last model year covered:            2020
     Waiver rate (pre-1981):              1.%
     Waiver rate (1981 and newer):        1.%
     Compliance Rate:                    85.%
     Inspection type:                    Computerized decentralized
     Inspection frequency                Annual
     Vehicle types covered:              LDGV - Yes
                                        LDGT1 - Yes
                                        LDGT2 - Yes
                                         HDGV - No
     1981 & later MYR test type:         Idle
0CTPS.mfg      MA
                     Minimum Temp: 68. (F)   Maximum Temp: 94. (F)
                     Period 1 RVP: 11.5      Period 2 RVP:  9.0 Period 2 Yr: 1989
0VOC HC emission factors include evaporative HC emission factors.
0__________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low           Altitude:  500. Ft.
                      I/M Program: Yes       Ambient Temp:   87.8 (F)
                Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:   LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV     MC  All Veh
+            ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.:    5.0    5.0    5.0           5.0    5.0    5.0    5.0    5.0
   VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:   6.05   7.11   7.45   7.22  13.77   1.36   1.78   4.87  14.57    6.60
 Exhst  HC:   2.93   4.17   4.36   4.23   8.57   1.36   1.78   4.87  10.00    3.67
 Evap.  HC:   0.47   0.40   0.46   0.42   1.48                         3.86    0.48
 Refuel HC:   0.14   0.18   0.18   0.18   0.30                                 0.14
 Runing HC:   2.39   2.27   2.36   2.30   3.31                                 2.20
 Rsting HC:   0.12   0.10   0.09   0.10   0.11                         0.71    0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC:  20.78  30.32  29.57  30.08  24.75   2.17  12.41  17.73 103.11   23.60
 ___________________________________________________________________________________
0User supplied veh registration distributions.
```

```
0Cal. Year: 1992          Region: Low          Altitude:  500. Ft.
                     I/M Program: Yes      Ambient Temp:   87.8 (F)
             Anti-tam. Program: No      Operating Mode:    20.6 / 27.3 / 20.6
0Veh. Type:   LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV    MC   All Veh
-           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 10.0   10.0   10.0          10.0   10.0   10.0   10.0   10.0
  VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  3.30   3.91   4.07   3.96   8.81   1.07   1.40   3.82   9.98   3.75
 Exhst  HC:  1.57   2.29   2.37   2.32   5.62   1.07   1.40   3.82   5.41   2.11
 Evap.  HC:  0.47   0.40   0.46   0.42   1.48                         3.86   0.48
 Refuel HC:  0.14   0.18   0.18   0.18   0.30                                0.14
 Runing HC:  1.00   0.95   0.97   0.96   1.30                                0.92
 Rsting HC:  0.12   0.10   0.09   0.10   0.11                         0.71   0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78  30.32  29.57  30.08  24.75   2.17  12.41  17.73 103.11  23.60
 __________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992          Region: Low          Altitude:  500. Ft.
                     I/M Program: Yes      Ambient Temp:   87.8 (F)
             Anti-tam. Program: No      Operating Mode:    20.6 / 27.3 / 20.6
0Veh. Type:   LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV    MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 15.0   15.0   15.0          15.0   15.0   15.0   15.0   15.0
  VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.52   2.95   3.06   2.99   6.60   0.85   1.12   3.07   8.41   2.87
 Exhst  HC:  1.11   1.67   1.71   1.68   3.84   0.85   1.12   3.07   3.84   1.53
 Evap.  HC:  0.47   0.40   0.46   0.42   1.48                         3.86   0.48
 Refuel HC:  0.14   0.18   0.18   0.18   0.30                                0.14
 Runing HC:  0.68   0.61   0.63   0.61   0.88                                0.61
 Rsting HC:  0.12   0.10   0.09   0.10   0.11                         0.71   0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78  30.32  29.57  30.08  24.75   2.17  12.41  17.73 103.11  23.60
 __________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992          Region: Low          Altitude:  500. Ft.
                     I/M Program: Yes      Ambient Temp:   87.8 (F)
             Anti-tam. Program: No      Operating Mode:    20.6 / 27.3 / 20.6
0Veh. Type:   LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV    MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 20.0   20.0   20.0          20.0   20.0   20.0   20.0   20.0
  VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  2.07   2.39   2.49   2.42   5.24   0.70   0.92   2.51   7.69   2.35
 Exhst  HC:  0.88   1.35   1.37   1.35   2.73   0.70   0.92   2.51   3.12   1.21
 Evap.  HC:  0.47   0.40   0.46   0.42   1.48                         3.86   0.48
 Refuel HC:  0.14   0.18   0.18   0.18   0.30                                0.14
 Runing HC:  0.46   0.37   0.39   0.38   0.62                                0.40
 Rsting HC:  0.12   0.10   0.09   0.10   0.11                         0.71   0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78  30.32  29.57  30.08  24.75   2.17  12.41  17.73 103.11  23.60
 __________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992          Region: Low          Altitude:  500. Ft.
                     I/M Program: Yes      Ambient Temp:   87.8 (F)
             Anti-tam. Program: No      Operating Mode:    20.6 / 27.3 / 20.6
0Veh. Type:   LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV    MC   All Veh
```

```
 Veh. Spd.: 25.0    25.0    25.0            25.0    25.0    25.0    25.0    25.0
   VMT Mix:  0.605   0.184   0.088           0.039   0.005   0.001   0.072   0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.80    2.01    2.09    2.04    4.42    0.59    0.77    2.11    7.25    2.01
 Exhst  HC:  0.69    1.04    1.05    1.04    2.03    0.59    0.77    2.11    2.68    0.95
 Evap.  HC:  0.47    0.40    0.46    0.42    1.48                            3.86    0.48
 Refuel HC:  0.14    0.18    0.18    0.18    0.30                                    0.14
 Runing HC:  0.37    0.30    0.31    0.31    0.50                                    0.33
 Rsting HC:  0.12    0.10    0.09    0.10    0.11                            0.71    0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78   30.32   29.57   30.08   24.75    2.17   12.41   17.73  103.11   23.60

0User supplied veh registration distributions.
0Cal. Year: 1992            Region: Low          Altitude:  500. Ft.
                       I/M Program: Yes      Ambient Temp:   87.8 (F)
                 Anti-tam. Program: No     Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV     MC    All Veh
+
 Veh. Spd.: 30.0    30.0    30.0            30.0    30.0    30.0    30.0    30.0
   VMT Mix:  0.605   0.184   0.088           0.039   0.005   0.001   0.072   0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.60    1.75    1.82    1.77    3.87    0.50    0.66    1.81    6.91    1.78
 Exhst  HC:  0.56    0.82    0.83    0.83    1.57    0.50    0.66    1.81    2.34    0.77
 Evap.  HC:  0.47    0.40    0.46    0.42    1.48                            3.86    0.48
 Refuel HC:  0.14    0.18    0.18    0.18    0.30                                    0.14
 Runing HC:  0.31    0.25    0.26    0.25    0.41                                    0.27
 Rsting HC:  0.12    0.10    0.09    0.10    0.11                            0.71    0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78   30.32   29.57   30.08   24.75    2.17   12.41   17.73  103.11   23.60

0User supplied veh registration distributions.
0Cal. Year: 1992            Region: Low          Altitude:  500. Ft.
                       I/M Program: Yes      Ambient Temp:   87.8 (F)
                 Anti-tam. Program: No     Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV     MC    All Veh
+
 Veh. Spd.: 35.0    35.0    35.0            35.0    35.0    35.0    35.0    35.0
   VMT Mix:  0.605   0.184   0.088           0.039   0.005   0.001   0.072   0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.46    1.56    1.62    1.58    3.50    0.44    0.58    1.58    6.65    1.60
 Exhst  HC:  0.47    0.67    0.68    0.67    1.26    0.44    0.58    1.58    2.08    0.65
 Evap.  HC:  0.47    0.40    0.46    0.42    1.48                            3.86    0.48
 Refuel HC:  0.14    0.18    0.18    0.18    0.30                                    0.14
 Runing HC:  0.25    0.21    0.22    0.21    0.35                                    0.23
 Rsting HC:  0.12    0.10    0.09    0.10    0.11                            0.71    0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78   30.32   29.57   30.08   24.75    2.17   12.41   17.73  103.11   23.60

0User supplied veh registration distributions.
0Cal. Year: 1992            Region: Low          Altitude:  500. Ft.
                       I/M Program: Yes      Ambient Temp:   87.8 (F)
                 Anti-tam. Program: No     Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV     MC    All Veh
+
 Veh. Spd.: 40.0    40.0    40.0            40.0    40.0    40.0    40.0    40.0
   VMT Mix:  0.605   0.184   0.088           0.039   0.005   0.001   0.072   0.006
0Composite Emission Factors (Gm/Mile)
```

```
 VOC     HC:  1.34    1.41    1.47    1.43    3.24    0.40    0.52    1.42    6.47    1.47
 Exhst   HC:  0.40    0.55    0.56    0.56    1.06    0.40    0.52    1.42    1.90    0.55
 Evap.   HC:  0.47    0.40    0.46    0.42    1.48                            3.86    0.48
 Refuel  HC:  0.14    0.18    0.18    0.18    0.30                                    0.14
 Runing  HC:  0.21    0.18    0.19    0.18    0.29                                    0.19
 Rsting  HC:  0.12    0.10    0.09    0.10    0.11                            0.71    0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId   HC: 20.78   30.32   29.57   30.08   24.75    2.17   12.41   17.73  103.11   23.60
 ___________________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992            Region: Low          Altitude:   500. Ft.
                       I/M Program: Yes       Ambient Temp:   87.8 (F)
                  Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:   LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV     MC    All Veh
+            ______  ______  ______  ______  ______  ______  ______  ______  ______  ______
 Veh. Spd.:  45.0    45.0    45.0            45.0    45.0    45.0    45.0    45.0
   VMT Mix:  0.605   0.184   0.088           0.039   0.005   0.001   0.072   0.006
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  1.25    1.30    1.36    1.32    3.06    0.36    0.48    1.30    6.37    1.36
 Exhst   HC:  0.35    0.47    0.47    0.47    0.93    0.36    0.48    1.30    1.80    0.48
 Evap.   HC:  0.47    0.40    0.46    0.42    1.48                            3.86    0.48
 Refuel  HC:  0.14    0.18    0.18    0.18    0.30                                    0.14
 Runing  HC:  0.17    0.15    0.16    0.15    0.24                                    0.15
 Rsting  HC:  0.12    0.10    0.09    0.10    0.11                            0.71    0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId   HC: 20.78   30.32   29.57   30.08   24.75    2.17   12.41   17.73  103.11   23.60
 ___________________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992            Region: Low          Altitude:   500. Ft.
                       I/M Program: Yes       Ambient Temp:   87.8 (F)
                  Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:   LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV     MC    All Veh
+            ______  ______  ______  ______  ______  ______  ______  ______  ______  ______
 Veh. Spd.:  50.0    50.0    50.0            50.0    50.0    50.0    50.0    50.0
   VMT Mix:  0.605   0.184   0.088           0.039   0.005   0.001   0.072   0.006
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  1.21    1.27    1.32    1.29    2.94    0.34    0.45    1.22    6.47    1.33
 Exhst   HC:  0.35    0.47    0.47    0.47    0.85    0.34    0.45    1.22    1.90    0.47
 Evap.   HC:  0.47    0.40    0.46    0.42    1.48                            3.86    0.48
 Refuel  HC:  0.14    0.18    0.18    0.18    0.30                                    0.14
 Runing  HC:  0.13    0.12    0.13    0.13    0.20                                    0.12
 Rsting  HC:  0.12    0.10    0.09    0.10    0.11                            0.71    0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId   HC: 20.78   30.32   29.57   30.08   24.75    2.17   12.41   17.73  103.11   23.60
 ___________________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992            Region: Low          Altitude:   500. Ft.
                       I/M Program: Yes       Ambient Temp:   87.8 (F)
                  Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:   LDGV   LDGT1   LDGT2    LDGT    HDGV    LDDV    LDDT    HDDV     MC    All Veh
+            ______  ______  ______  ______  ______  ______  ______  ______  ______  ______
 Veh. Spd.:  55.0    55.0    55.0            55.0    55.0    55.0    55.0    55.0
   VMT Mix:  0.605   0.184   0.088           0.039   0.005   0.001   0.072   0.006
0Composite Emission Factors (Gm/Mile)
 VOC     HC:  1.26    1.33    1.39    1.35    2.86    0.32    0.43    1.16    6.82    1.36
 Exhst   HC:  0.42    0.55    0.55    0.55    0.81    0.32    0.43    1.16    2.25    0.53
 Evap.   HC:  0.47    0.40    0.46    0.42    1.48                            3.86    0.48
 Refuel  HC:  0.14    0.18    0.18    0.18    0.30                                    0.14
 Runing HC:  0.11   0.10   0.11   0.11   0.17                                0.10
 Rsting HC:  0.12   0.10   0.09   0.10   0.11                         0.71   0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78  30.32  29.57  30.08  24.75    2.17  12.41  17.73 103.11  23.60
________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes      Ambient Temp:   87.8 (F)
                 Anti-tam. Program: No    Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV    MC   All Veh
+           _____  _____  _____  _____  _____  _____  _____  _____  _____  _____
 Veh. Spd.: 60.0   60.0   60.0          60.0   60.0   60.0   60.0   60.0
   VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.31   1.40   1.46   1.42   2.83   0.32   0.42   1.14   7.18   1.41
 Exhst  HC:  0.48   0.64   0.64   0.64   0.80   0.32   0.42   1.14   2.61   0.60
 Evap.  HC:  0.47   0.40   0.46   0.42   1.48                        3.86   0.48
 Refuel HC:  0.14   0.18   0.18   0.18   0.30                               0.14
 Runing HC:  0.09   0.09   0.09   0.09   0.14                               0.09
 Rsting HC:  0.12   0.10   0.09   0.10   0.11                        0.71   0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78  30.32  29.57  30.08  24.75    2.17  12.41  17.73 103.11  23.60
________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes      Ambient Temp:   87.8 (F)
                 Anti-tam. Program: No    Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV    MC   All Veh
+           _____  _____  _____  _____  _____  _____  _____  _____  _____  _____
 Veh. Spd.: 65.0   65.0   65.0          65.0   65.0   65.0   65.0   65.0
   VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 VOC    HC:  1.36   1.48   1.53   1.50   2.84   0.32   0.42   1.14   7.53   1.47
 Exhst  HC:  0.55   0.72   0.73   0.72   0.83   0.32   0.42   1.14   2.96   0.66
 Evap.  HC:  0.47   0.40   0.46   0.42   1.48                        3.86   0.48
 Refuel HC:  0.14   0.18   0.18   0.18   0.30                               0.14
 Runing HC:  0.08   0.08   0.08   0.08   0.12                               0.08
 Rsting HC:  0.12   0.10   0.09   0.10   0.11                        0.71   0.11
0Hot Stabilized Idle Emission Factors (Gm/Hr)
 VOCId  HC: 20.78  30.32  29.57  30.08  24.75    2.17  12.41  17.73 103.11  23.60
________________________________________________________________________________
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1         PROMPT - vertical flag input, no prompting
     MOBILE4.1 CO 1992 (w/state age distribution)
1         TAMFLG - default tampering rates
1         SPDFLG - one speed per scenario
1         VMFLAG - default vehicle mix
3         MYMRFG - local registration and default mileage accrual rates
1         NEWFLG - default exhaust emission rates
2         IMFLAG - include I/M program
1         ALHFLG - no additional correction factor inputs
1         ATPFLG - no anti-tampering program
5         RLFLAG - set to 5 because no HC calculated
2         LOCFLG - read in local area parameters one time for all scenarios
1         TEMFLG - use range of min - max
4         OUTFMT - 80 column descriptive format
2         PRTFLG - print CO values only (1-HC,3-NOx,4-all)
2         IDLFLG - print idle emissions results
1         NMHFLG - print set to 1 because no HC calculated (interflag)
1         HCFLAG - set to 1 because HC not calculated (interflag)
.029 .064 .078 .094 .108 .112 .108 .093 .079 .053   .LDGV ages 1-10
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003   .LDGV ages 11-20
.003 .002 .002 .001 .008                             .LDGV ages 21-25
.033 .080 .086 .116 .140 .134 .102 .070 .055 .036   .LDGT1 ages 1-10
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004   .LDGT1 ages 11-20
.003 .002 .002 .001 .007                             .LDGT1 ages 21-25
.033 .080 .086 .116 .140 .134 .102 .070 .055 .036   .LDGT2 ages 1-10
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004   .LDGT2 ages 11-20
.003 .002 .002 .001 .007                             .LDGT2 ages 21-25
.022 .050 .071 .112 .134 .131 .109 .065 .046 .027   .HDGV age 1-10
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014   .HDGV age 11-20
.010 .007 .008 .006 .021                             .HDGV age 21-25
.029 .064 .078 .094 .108 .112 .108 .093 .079 .053   .LDDV age 1-10
.038 .032 .026 .026 .018 .011 .006 .004 .003 .003   .LDDV age 11-20
.003 .002 .002 .001 .008                             .LDDV age 21-25
.033 .080 .086 .116 .140 .134 .102 .070 .055 .036   .LDDT age 1-10
.024 .018 .014 .026 .020 .013 .007 .004 .004 .004   .LDDT age 11-20
.003 .002 .002 .001 .007                             .LDDT age 21-25
.022 .050 .071 .112 .134 .131 .109 .065 .046 .027   .HDDV age 1-10
.021 .023 .023 .031 .022 .015 .009 .010 .012 .014   .HDDV age 11-20
.010 .007 .008 .006 .021                             .HDDV age 21-25
.023 .054 .054 .063 .061 .068 .096 .079 .052 .062   .MC age 1-10
.078 .309 .000 .000 .000 .000 .000 .000 .000 .000   .MC age 11 & 12
.000 .000 .000 .000 .000                             .MC blank record
83 12 78 20 1. 1. 085 2 1 2221 1 11                 .I/M data
CTPS.mfg          C  29.  30. 13.5 13.5 89 1 1      .LAP record
1 92  3.0 30.0 20.6 27.3 20.6
1 92  4.0 30.0 20.6 27.3 20.6
1 92  5.0 30.0 20.6 27.3 20.6
1 92  6.0 30.0 20.6 27.3 20.6
1 92  7.0 30.0 20.6 27.3 20.6
1 92  8.0 30.0 20.6 27.3 20.6
1 92  9.0 30.0 20.6 27.3 20.6
1 92 10.0 30.0 20.6 27.3 20.6
1 92 11.0 30.0 20.6 27.3 20.6
1 92 12.0 30.0 20.6 27.3 20.6
1 92 13.0 30.0 20.6 27.3 20.6
1 92 14.0 30.0 20.6 27.3 20.6
1 92 15.0 30.0 20.6 27.3 20.6
1 92 16.0 30.0 20.6 27.3 20.6
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1 92 17.0 30.0 20.6 27.3 20.6
1 92 18.0 30.0 20.6 27.3 20.6
1 92 19.0 30.0 20.6 27.3 20.6
1 92 20.0 30.0 20.6 27.3 20.6
1 92 21.0 30.0 20.6 27.3 20.6
1 92 22.0 30.0 20.6 27.3 20.6
1 92 23.0 30.0 20.6 27.3 20.6
1 92 24.0 30.0 20.6 27.3 20.6
1 92 25.0 30.0 20.6 27.3 20.6
1 92 26.0 30.0 20.6 27.3 20.6
1 92 27.0 30.0 20.6 27.3 20.6
1 92 28.0 30.0 20.6 27.3 20.6
1 92 29.0 30.0 20.6 27.3 20.6
1 92 30.0 30.0 20.6 27.3 20.6
1 92 31.0 30.0 20.6 27.3 20.6
1 92 32.0 30.0 20.6 27.3 20.6
1 92 33.0 30.0 20.6 27.3 20.6
1 92 34.0 30.0 20.6 27.3 20.6
1 92 35.0 30.0 20.6 27.3 20.6
1 92 36.0 30.0 20.6 27.3 20.6
1 92 37.0 30.0 20.6 27.3 20.6
1 92 38.0 30.0 20.6 27.3 20.6
1 92 39.0 30.0 20.6 27.3 20.6
1 92 40.0 30.0 20.6 27.3 20.6
1 92 41.0 30.0 20.6 27.3 20.6
1 92 42.0 30.0 20.6 27.3 20.6
1 92 43.0 30.0 20.6 27.3 20.6
1 92 44.0 30.0 20.6 27.3 20.6
1 92 45.0 30.0 20.6 27.3 20.6
1 92 46.0 30.0 20.6 27.3 20.6
1 92 47.0 30.0 20.6 27.3 20.6
1 92 48.0 30.0 20.6 27.3 20.6
1 92 49.0 30.0 20.6 27.3 20.6
1 92 50.0 30.0 20.6 27.3 20.6
1 92 51.0 30.0 20.6 27.3 20.6
1 92 52.0 30.0 20.6 27.3 20.6
1 92 53.0 30.0 20.6 27.3 20.6
1 92 54.0 30.0 20.6 27.3 20.6
1 92 55.0 30.0 20.6 27.3 20.6
1 92 56.0 30.0 20.6 27.3 20.6
1 92 57.0 30.0 20.6 27.3 20.6
1 92 58.0 30.0 20.6 27.3 20.6
1 92 59.0 30.0 20.6 27.3 20.6
1 92 60.0 30.0 20.6 27.3 20.6
1 92 61.0 30.0 20.6 27.3 20.6
1 92 62.0 30.0 20.6 27.3 20.6
1 92 63.0 30.0 20.6 27.3 20.6
1 92 64.0 30.0 20.6 27.3 20.6
1 92 65.0 30.0 20.6 27.3 20.6
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1     MOBILE4.1 CO 1992 (w/state age distribution)
1MOBILE4.1(4Nov91)
0
-M 49 Warning:
-                     1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
-                     1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
-                     1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
-                    0.999     MYR sum not = 1. (will normalize)
-M 49 Warning:
-                     1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
-                     1.00     MYR sum not = 1. (will normalize)
-M 49 Warning:
-                    0.999     MYR sum not = 1. (will normalize)
-M 49 Warning:
-                    0.999     MYR sum not = 1. (will normalize)
-M111 Error:
-              The calculated exhaust      temperature  31.3 is < daily min temp or >
0I/M program selected:
0    Start year (January 1):               1983
     Pre-1981 MYR stringency rate:          12%
     First model year covered:             1978
     Last model year covered:              2020
     Waiver rate (pre-1981):                1.%
     Waiver rate (1981 and newer):          1.%
     Compliance Rate:                      85.%
     Inspection type:                      Computerized decentralized
     Inspection frequency                  Annual
     Vehicle types covered:                 LDGV - Yes
                                           LDGT1 - Yes
                                           LDGT2 - Yes
                                            HDGV - No
     1981 & later MYR test type:           Idle
0CTPS.mfg
                        Minimum Temp: 23. (F)   Maximum Temp: 39. (F)
                        Period 1 RVP: 13.5      Period 2 RVP: 13.5 Period 2 Yr: 1989
0Total HC emission factors include evaporative HC emission factors.
0__________________________________________________________________________________
0User supplied veh registration distributions.
0Cal. Year: 1992            Region: Low               Altitude:  500. Ft.
                        I/M Program: Yes          Ambient Temp:   31.3 (F)
                   Anti-tam. Program: No        Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
-           _____  _____  _____  _____  _____  _____  _____  _____  _____  _____
 Veh. Spd.:  5.0    5.0    5.0           5.0    5.0    5.0    5.0    5.0
   VMT Mix: 0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 83.50  94.32  98.98  95.83 151.52   4.35   4.81  32.51 147.02  85.67
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.33  32.83  51.91 331.41 439.23
 __________________________________________________________________________________
-M111 Error:
-              The calculated exhaust      temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992            Region: Low               Altitude:  500. Ft.
                        I/M Program: Yes          Ambient Temp:   31.3 (F)
                   Anti-tam. Program: No        Operating Mode:   20.6 / 27.3 / 20.6
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0Veh. Type:  LDGV   LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 10.0   10.0   10.0           10.0   10.0   10.0   10.0   10.0
   VMT Mix:  0.605  0.184  0.088          0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 44.76  50.32  52.19  50.92 100.81   3.00   3.32  22.42  70.63  46.88
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 _________________________________________________________________________________
-M111 Error:
+              The calculated exhaust      temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992             Region: Low           Altitude:  500. Ft.
                        I/M Program: Yes       Ambient Temp:   31.3 (F)
                  Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV   LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 15.0   15.0   15.0           15.0   15.0   15.0   15.0   15.0
   VMT Mix:  0.605  0.184  0.088          0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 31.92  35.92  36.81  36.21  70.86   2.17   2.39  16.18  45.88  33.36
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 _________________________________________________________________________________
-M111 Error:
+              The calculated exhaust      temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992             Region: Low           Altitude:  500. Ft.
                        I/M Program: Yes       Ambient Temp:   31.3 (F)
                  Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV   LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 20.0   20.0   20.0           20.0   20.0   20.0   20.0   20.0
   VMT Mix:  0.605  0.184  0.088          0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 25.30  28.48  28.95  28.63  52.63   1.64   1.81  12.22  34.48  26.22
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 _________________________________________________________________________________
-M111 Error:
+              The calculated exhaust      temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992             Region: Low           Altitude:  500. Ft.
                        I/M Program: Yes       Ambient Temp:   31.3 (F)
                  Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV   LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 25.0   25.0   25.0           25.0   25.0   25.0   25.0   25.0
   VMT Mix:  0.605  0.184  0.088          0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 19.01  21.24  21.42  21.30  41.29   1.29   1.43   9.66  27.49  19.76
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 _________________________________________________________________________________
-M111 Error:
+              The calculated exhaust      temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992             Region: Low           Altitude:  500. Ft.
                        I/M Program: Yes       Ambient Temp:   31.3 (F)
                  Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
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0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 30.0   30.0   30.0          30.0   30.0   30.0   30.0   30.0
   VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 14.77  16.27  16.35  16.30  34.23   1.07   1.18   7.99  22.44  15.41
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 ______________________________________________________________________________
-M111 Error:
+           The calculated exhaust     temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes      Ambient Temp:   31.3 (F)
                 Anti-tam. Program: No    Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 35.0   35.0   35.0          35.0   35.0   35.0   35.0   35.0
   VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 11.74  12.69  12.71  12.70  29.99   0.93   1.02   6.91  18.69  12.33
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 ______________________________________________________________________________
-M111 Error:
+           The calculated exhaust     temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes      Ambient Temp:   31.3 (F)
                 Anti-tam. Program: No    Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 40.0   40.0   40.0          40.0   40.0   40.0   40.0   40.0
   VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO:  9.48  10.09  10.02  10.07  27.75   0.84   0.93   6.26  16.09  10.10
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 ______________________________________________________________________________
-M111 Error:
+           The calculated exhaust     temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes      Ambient Temp:   31.3 (F)
                 Anti-tam. Program: No    Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 45.0   45.0   45.0          45.0   45.0   45.0   45.0   45.0
   VMT Mix:  0.605  0.184  0.088         0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO:  7.77   8.18   7.98   8.12  27.13   0.80   0.88   5.94  14.45   8.48
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 ______________________________________________________________________________
-M111 Error:
+           The calculated exhaust     temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes      Ambient Temp:   31.3 (F)
                 Anti-tam. Program: No    Operating Mode:   20.6 / 27.3 / 20.6
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0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 50.0   50.0   50.0           50.0   50.0   50.0   50.0   50.0
   VMT Mix:  0.605  0.184  0.088          0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO:  9.14   9.60   9.23   9.48  28.03   0.79   0.87   5.89  18.19   9.73
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 ______________________________________________________________________________
-M111 Error:
+           The calculated exhaust     temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes       Ambient Temp:   31.3 (F)
                 Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 55.0   55.0   55.0           55.0   55.0   55.0   55.0   55.0
   VMT Mix:  0.605  0.184  0.088          0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 14.67  15.42  14.82  15.22  30.59   0.82   0.91   6.12  29.21  14.82
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 ______________________________________________________________________________
-M111 Error:
+           The calculated exhaust     temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes       Ambient Temp:   31.3 (F)
                 Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 60.0   60.0   60.0           60.0   60.0   60.0   60.0   60.0
   VMT Mix:  0.605  0.184  0.088          0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 20.21  21.24  20.41  20.97  35.28   0.89   0.98   6.65  40.23  20.01
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 ______________________________________________________________________________
-M111 Error:
+           The calculated exhaust     temperature  31.3 is < daily min temp or >
0User supplied veh registration distributions.
0Cal. Year: 1992           Region: Low          Altitude:  500. Ft.
                      I/M Program: Yes       Ambient Temp:   31.3 (F)
                 Anti-tam. Program: No      Operating Mode:   20.6 / 27.3 / 20.6
0Veh. Type:  LDGV  LDGT1  LDGT2   LDGT   HDGV   LDDV   LDDT   HDDV   MC   All Veh
+           ______ ______ ______ ______ ______ ______ ______ ______ ______ ______
 Veh. Spd.: 65.0   65.0   65.0           65.0   65.0   65.0   65.0   65.0
   VMT Mix:  0.605  0.184  0.088          0.039  0.005  0.001  0.072  0.006
0Composite Emission Factors (Gm/Mile)
 Exhst  CO: 25.75  27.06  26.00  26.71  42.98   1.01   1.12   7.57  51.25  25.36
0Hot Stabilized Idle Emission Factors (Gm/Hr)
  Idle  CO:459.98 534.51 521.21 530.21 287.88  21.55  32.83  51.91 331.41 439.23
 ______________________________________________________________________________
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APPENDIX D

AIRCRAFT DATA

APPENDIX D.1-1

TOTAL POLLUTANTS FOR SPECIFIED FLEET MIX

ENGINE DISCRIPTION	# of ENG	# of LTO'S	TO	CO	AP	LD	VOC LBS.	CO LBS.	NOx LBS.	PART LBS.	SMOKE #
AIRBUS A-300-600 GE CF6-80C2A5 Engine ID Number: 59	2	564	0.7	2.2	4	26	7374.88	34742.31	31670.22	0	7.8
AIRBUS A-310-200 P&WA JT9D-7RE1(H)A1-600 Engine ID Number: 22	2	34	0.7	2.2	4	26	184.62	791.6	1966.49	0	4.3
AIRBUS A-310-200 10-300 P&WA PW4152 Engine ID Number: 35	2	779	0.7	2.2	4	26	945.47	12870.78	36892.84	0	12.7
BOEING B-727-200 P&WA JT8D-7 Engine ID Number: 3	3	429	0.7	2.2	4	26	6567.96	23115.97	8732.23	0	22.2
BOEING B-727-100 P&WA JT8D-7A Engine ID Number: 211	3	107	0.7	2.2	4	26	1638.16	5765.52	2177.97	0	22.2
BOEING B-727-100 P&W JT8D-7B Engine ID Number: 212	3	1958	0.7	2.2	4	26	29976.85	105503.7	39854.8	0	22.2
BOEING B-727-100 P&WA JT8D-9 Engine ID Number: 5	3	27	0.7	2.2	4	26	127.4	576.18	622.89	0	10.1
BOEING B-727-100 P&WA JT8D-9A Engine ID Number: 72	3	54	0.7	2.2	4	26	254.8	1152.35	1245.79	0	10.1
BOEING B-727-100 (CARGO) P&WA JT8 D-7A Engine ID Number: 211	3	35	0.7	2.2	4	26	535.85	1885.92	712.42	0	22.2
BOEING B-727-100 (CARGO) P&W JT8 D-7B Engine ID Number: 212	3	529	0.7	2.2	4	26	8098.96	28504.3	10767.72	0	22.2

TOTAL POLLUTANTS FOR SPECIFIED FLEET MIX

ENGINE DISCRIPTION	# of ENG	# of LTO'S	TO	CO	AP	LD	VOC LBS.	CO LBS.	NOx LBS.	PART LBS.	SMOKE #
BOEING B-727-100 (CARGO) P&WA JT8-D7C Engine ID Number: 4	3	6	0.7	2.2	4	26	89.52	318.21	133.74	0	0
BOEING B-7 27-100(CARG) P&WA JT8 D-9A Engine ID Number: 71	3	12	0.7	2.2	4	26	179.05	636.42	267.48	0	0
BOEING B-7 27-200 Not App Wei ghted Average Engine ID Number: 0	3	31234	0.7	2.2	4	26	397837.93	1437903	752672.3	0	8.1
BOEING B-7 27-200(CARG) Not App Wei ghted Average Engine ID Number: 0	3	60	0.7	2.2	4	26	225.88	1257.56	1618.64	0	16.6
BOEING B-7 37-200 Not App Wei ghted Average Engine ID Number: 0	2	7073	0.7	2.2	4	26	59972.35	215716.3	109552.9	0	8.2
BOEING B-7 37-200(CARG) Not App Wei ghted Average Engine ID Number: 0	2	991	0.7	2.2	4	26	8130.77	28525.59	16800.72	0	7.6
BOEING B-7 37-300 GE CFM 56-3 Engine ID Number: 33	2	8902	0.7	2.2	4	26	14162.54	246267.8	156632.5	0	4
BOEING B-7 37-400 GE CFM 56-3 Engine ID Number: 33	2	1774	0.7	2.2	4	26	2822.33	49076.5	31213.88	0	4
BOEING B-7 47 P&WA JT9 D-7A (MOD V) Engine ID Number: 74	4	242	0.7	2.2	4	26	19323.24	40573.36	30781.14	0	0
BOEING B-7 47 (CARG) P&WA JT9 D-7F (MOD V) Engine ID Number: 18	4	193	0.7	2.2	4	26	15410.68	32358.09	24548.59	0	0

TOTAL POLLUTANTS FOR SPECIFIED FLEET MIX

ENGINE DISCRIPTION	# of ENG	# of LTO'S	TO	CO	AP	LD	VOC LBS.	CO LBS.	NOx LBS.	PART LBS.	SMOKE #
BOEING B-7 47-200 P&WA JT9 D-7 Engine ID Number: 145	4	2	0.7	2.2	4	26	193.96	519.66	166.32	41008	0
BOEING B-7 47-200 P&WA JT9 D-7F (MOD V) Engine ID Number: 18	4	9	0.7	2.2	4	26	718.63	1508.93	1144.75	0	0
BOEING B-7 47-200 P&WA JT9 D-7A (MOD V) Engine ID Number: 74	4	97	0.7	2.2	4	26	7745.27	16262.88	12337.89	0	0
BOEING B-7 47-200 P&WA JT9 D-7Q Engine ID Number: 76	4	23	0.7	2.2	4	26	924.66	4045.56	2511.14	0	0
BOEING B-7 47-200 P&WA JT9 D-7R4G2 Engine ID Number: 23	4	5	0.7	2.2	4	26	27.33	201.21	656.91	0	6.8
BOEING B-7 47-400 P&WA PW4 056 Engine ID Number: 36	4	1	0.7	2.2	4	26	2.54	31.55	115.02	0	14.3
BOEING B-7 47-SP P&WA JT9 D-7A (MOD V) Engine ID Number: 74	4	1	0.7	2.2	4	26	79.85	167.66	127.19	0	0
BOEING B-7 47F (CARG) P&WA JT9 D-7Q Engine ID Number: 76	4	13	0.7	2.2	4	26	522.64	2286.62	1419.34	0	0
BOEING B-7 47F (CARG) P&WA JT9 D-7R4G2 Engine ID Number: 23	4	9	0.7	2.2	4	26	49.2	362.17	1182.43	0	6.8
BOEING B-7 47F (CARG) P&WA JT9 D-7F (MOD V) Engine ID Number: 18	4	57	0.7	2.2	4	26	4551.34	9556.54	7250.1	0	0

TOTAL POLLUTANTS FOR SPECIFIED FLEET MIX

ENGINE DISCRIPTION	# of ENG	# of LTO'S	TO	CO	AP	LD	VOC LBS.	CO LBS.	NOx LBS.	PART LBS.	SMOKE #
BOEING B-7 57-200 Not App Wei ghted Average Engine ID Number: 0	2	9496	0.7	2.2	4	26	22429.65	228110.5	349337.6	0	0
BOEING B-7 67-300 Not App Wei ghted Average Engine ID Number: 0	2	3527	0.7	2.2	4	26	46118.14	217253.9	192253.5	0	7.8
MCDONNE DOUG 0-10 GE CF6 -6D Engine ID Number: 39	3	4026	0.7	2.2	4	26	154991.83	412628.1	309180.8	0	4
MCDONNE DOUG 0-30 GE CF6 -50C1 Engine ID Number: 207	3	31	0.7	2.2	4	26	2732.37	4593.99	2751.32	0	6.5
MCDONNE DOUG -62 (CARG) P&WA JT3 D-7 Engine ID Number: 143	4	800	0.7	2.2	4	26	174681.38	210188.5	20520.21	*****.**	0
MCDONNE DOUG -10 P&WA JT8 D-7 Engine ID Number: 3	2	830	0.7	2.2	4	26	8471.5	29815.47	11263.02	0	22.2
MCDONNE DOUG -15F Not App Wei ghted Average Engine ID Number: 0	2	10	0.7	2.2	4	26	102.07	359.22	135.7	0	22.2
MCDONNE DOUG -30 Not App Wei ghted Average Engine ID Number: 0	2	14552	0.7	2.2	4	26	148636.4	522676.7	204314.8	0	16.2
MCDONNE DOUG -40 Not App Wei ghted Average Engine ID Number: 0	2	44	0.7	2.2	4	26	495.28	1690.25	776.03	0	1.1
MCDONNE DOUG -50 Not App Wei ghted Average Engine ID Number: 0	2	1104	0.7	2.2	4	26	10884.85	34371.15	20710.65	0	3.2

TOTAL POLLUTANTS FOR SPECIFIED FLEET MIX

ENGINE DISCRIPTION	# of ENG	# of LTO'S	TO	CO	AP	LD	VOC LBS.	CO LBS.	NOx LBS.	PART LBS.	SMOKE #
DOUG -80 MCDONNE Wei ghted Average Not App Engine ID Number: 0	2	11896	0.7	2.2	4	26	49581.79	170213.7	312939.4	0	13.3
FOKKER F10 0-100 Not App Wei ghted Average Engine ID Number: 0	2	1800	0.7	2.2	4	26	5497.56	40161.71	22466.27	0	0
LOCKHEE D Not App L-1 011-100 Engine Wei ghted Ave 0	3	4335	0.7	2.2	4	26	689508.48	1066942	286743.1	0	14.6
LOCKHEE L-1 011-500 RR RB2 11-524B4 Engine ID Number: 188	3	2	0.7	2.2	4	26	12.35	66.41	224.01	0	0
CESSNA 337 H SKYMASTER TEL/CON TSI O-360C Engine ID Number: 160	2	1080	0.5	2.5	4.5	26	1657.01	27185.39	102.26	0	0
TOTALS:							1904475	5268740	3019495		0

ESTIMATED AIR POLLUTANT EMISSIONS FOR PROJECTED MILITARY AND POTENTIAL CIVIL AIRCRAFT OPERATIONS AT WESTOVER ARB

			Emission Factor (lb/cycle)						Estimated Annual Emissions (tons)				
Aircraft	Opn.	#/yr	CO	HC	NOx	PM	SO2		CO	HC	NOx	PM	SO2
Based Military Aircraft													
C-5A	LTO	525	220.5	79.4	66.2	0.1	5.5		57.88	20.84	17.36	0.03	1.45
	T&G	2,415	14.1	4.6	28.7	0.0	1.3		17.04	5.59	34.61	0.04	1.60
	Hrs.	179	235.2	79.2	23.4	0.1	6.0		20.99	7.07	2.09	0.01	0.54
	Maint.								10.90	3.70	7.10	0.00	0.40
								Subtotal C-5:	106.81	37.20	61.17	0.07	3.98
UH-1	LTO	710	1.5	2.5	1.2	0.0	0.2		0.55	0.90	0.42	0.00	0.07
	T&G	7,100	0.8	1.3	0.6	0.0	0.1		2.74	4.50	2.11	0.00	0.35
								Subtotal UH-1:	3.29	5.40	2.54	0.00	0.42
								Subtotal Based Military Aircraft:	110.10	42.60	63.70	0.07	4.40
Transient Military & Military Support Aircraft													
Air Force Aircraft													
A-7	LTO	1	66.2	48.5	11.2	0.4	1.1		0.03	0.02	0.01	0.00	0.00
	T&G		1.8	0.4	3.7	0.1	0.3		0.00	0.00	0.00	0.00	0.00
A-10	LTO	26	44.1	13.0	3.3	0.0	0.7		0.57	0.17	0.04	0.00	0.01
	T&G	780	1.9	0.1	2.1	0.0	0.3		0.75	0.05	0.83	0.00	0.11
B-52D/F	LTO		485.1	419.0	72.8	10.4	13.9		0.00	0.00	0.00	0.00	0.00
	T&G		17.2	2.9	26.5	4.4	3.3		0.00	0.00	0.00	0.00	0.00
B-52H	LTO		507.2	639.5	44.1	7.1	10.1		0.00	0.00	0.00	0.00	0.00
	T&G		15.4	6.4	26.5	4.6	3.5		0.00	0.00	0.00	0.00	0.00
C-5A	LTO	78	220.5	79.4	66.2	0.1	5.5		8.60	3.10	2.58	0.00	0.21
	T&G		14.1	28.7	28.7	0.0	1.3		0.00	0.00	0.00	0.00	0.00
C-9A	LTO		41.9	8.4	4.9	2.4	1.5		0.00	0.00	0.00	0.00	0.00
	T&G		11.0	2.2	2.4	1.3	0.7		0.00	0.00	0.00	0.00	0.00
C-130H	LTO	520	39.7	30.9	19.6	1.7	3.5		10.32	8.03	5.10	0.45	0.92
	T&G	2,080	2.6	1.0	3.7	0.3	0.5		2.75	1.01	3.90	0.30	0.53
KC-135A	LTO		286.7	220.5	24.3	1.7	5.7		0.00	0.00	0.00	0.00	0.00
	T&G		18.3	7.3	12.1	0.9	1.4		0.00	0.00	0.00	0.00	0.00
C-135B	LTO	52	308.7	396.9	33.1	5.5	6.8		8.03	10.32	0.86	0.14	0.18
	T&G		9.5	4.2	12.6	2.1	1.7		0.00	0.00	0.00	0.00	0.00
C-141	LTO	104	216.1	174.2	19.0	1.4	4.0		11.24	9.06	0.99	0.07	0.21
	T&G		8.2	2.1	9.9	0.8	1.2		0.00	0.00	0.00	0.00	0.00
F-4C/F	LTO		50.7	9.7	8.6	1.7	2.1		0.00	0.00	0.00	0.00	0.00
	T&G		4.9	0.4	3.7	0.8	0.8		0.00	0.00	0.00	0.00	0.00
F-4E	LTO		39.7	8.4	11.2	1.3	2.2		0.00	0.00	0.00	0.00	0.00
	T&G		10.1	1.8	4.6	0.6	0.9		0.00	0.00	0.00	0.00	0.00
F-111A	LTO		99.2	79.4	16.3	2.1	2.6		0.00	0.00	0.00	0.00	0.00
	T&G		5.1	0.4	6.4	1.1	0.8		0.00	0.00	0.00	0.00	0.00
F-111D/E	LTO		75.0	26.5	24.3	0.4	3.3		0.00	0.00	0.00	0.00	0.00

	T&G		4.9	0.5	6.2	0.1	1.0		0.00	0.00	0.00	0.00	0.00
F-111F	LTO		75.0	26.5	24.3	0.4	3.3		0.00	0.00	0.00	0.00	0.00
	T&G		4.9	0.5	6.4	0.1	1.0		0.00	0.00	0.00	0.00	0.00
F-15	LTO	52	28.7	3.5	10.8	0.3	2.1		0.75	0.09	0.28	0.01	0.06
	T&G	104	3.1	0.3	5.7	0.2	0.8		0.16	0.02	0.30	0.01	0.04
F-16	LTO	26	21.8	2.9	7.1	0.2	1.1		0.28	0.04	0.09	0.00	0.01
	T&G	52	0.4	0.1	2.7	0.0	0.1		0.01	0.00	0.07	0.00	0.00
O-2	LTO		59.5	6.6	0.2	3.1	0.0		0.00	0.00	0.00	0.00	0.00
	T&G		17.4	0.4	0.1	0.6	0.0		0.00	0.00	0.00	0.00	0.00
OV10	LTO		7.9	2.1	3.7	0.2	0.4		0.00	0.00	0.00	0.00	0.00
	T&G		1.3	0.1	1.0	0.1	0.1		0.00	0.00	0.00	0.00	0.00
T-33	LTO		61.7	7.9	1.5	0.3	0.7		0.00	0.00	0.00	0.00	0.00
	T&G		14.3	0.8	0.7	0.1	0.3		0.00	0.00	0.00	0.00	0.00
T-37	LTO	52	33.1	4.4	0.7	0.1	0.3		0.86	0.11	0.02	0.00	0.01
	T&G	104	4.6	0.3	0.2	0.0	0.1		0.24	0.02	0.01	0.00	0.00
T-38	LTO	26	88.2	13.5	1.3	0.0	0.8		1.15	0.17	0.02	0.00	0.01
	T&G	52	8.6	0.5	0.6	0.0	0.2		0.22	0.01	0.01	0.00	0.01
T-39	LTO		20.9	2.6	1.1	0.0	0.4		0.00	0.00	0.00	0.00	0.00
	T&G		3.3	0.3	0.6	0.0	0.2		0.00	0.00	0.00	0.00	0.00
T-41	LTO		26.5	2.6	0.1	1.3	0.0		0.00	0.00	0.00	0.00	0.00
	T&G		9.7	0.4	0.0	0.3	0.0		0.00	0.00	0.00	0.00	0.00
								Subtotal	45.96	32.22	15.10	1.00	2.31

Other Military Aircraft

A-4C	LTO		16.6	1.1	2.2	0.0	0.0		0.00	0.00	0.00	0.00	0.00
F-14	LTO		39.9	17.4	7.6	24.3	1.2		0.00	0.00	0.00	0.00	0.00
P-3	LTO		32.4	20.3	9.6	4.4	1.0		0.00	0.00	0.00	0.00	0.00
S3A	LTO		34.2	6.4	4.0	0.0	1.0		0.00	0.00	0.00	0.00	0.00
								Subtotal:	0.00	0.00	0.00	0.00	0.00

Helicopters

UH-1	LTO	78	1.5	2.5	1.2	0.0	0.2		0.06	0.10	0.05	0.00	0.01
	T&G	1,560	0.8	1.3	0.6	0.0	0.1		0.60	0.99	0.46	0.00	0.08
HH-3	LTO		13.5	6.8	3.0	0.4	0.4		0.00	0.00	0.00	0.00	0.00
CH-47	LTO	26	2.1	2.1	0.7	0.0	0.0		0.03	0.03	0.01	0.00	0.00
	T&G	700	1.0	1.0	0.3	0.0	0.0		0.37	0.37	0.12	0.00	0.00
								Subtotal:	1.06	1.48	0.64	0.00	0.09

Military Support Aircraft (LogAir, etc.)

707-320B	LTO		262.7	218.3	25.7	4.5	4.3	0.00	0.00	0.00	0.00	0.00
727-200	LTO	208	56.0	13.4	29.6	1.2	3.3	5.82	1.40	3.08	0.12	0.34
737-200	LTO		37.3	9.0	19.8	0.8	2.2	0.00	0.00	0.00	0.00	0.00
747-200B	LTO		259.6	96.9	82.4	5.2	7.2	0.00	0.00	0.00	0.00	0.00
747-200B	LTO		108.9	22.4	107.5	5.2	8.0	0.00	0.00	0.00	0.00	0.00
747-200B	LTO		66.8	10.0	124.9	0.0	7.5	0.00	0.00	0.00	0.00	0.00

L1011-200	LTO		61.1	7.5	93.7	0.0	5.6		0.00	0.00	0.00	0.00	0.00
L1011-100	LTO		199.4	138.4	64.3	0.0	4.9		0.00	0.00	0.00	0.00	0.00
DC8-63	LTO		262.7	218.3	25.7	1.2	3.3		0.00	0.00	0.00	0.00	0.00
DC9-50	LTO	104	37.3	9.0	19.8	0.8	2.2		1.94	0.47	1.03	0.04	0.11
DC10-30	LTO		116.9	47.1	48.9	0.2	5.0		0.00	0.00	0.00	0.00	0.00
								Subtotal	7.76	1.86	4.11	0.16	0.45
								Subtotal Transient	54.78	35.57	19.85	1.16	2.85
								Total Military	164.88	78.16	83.55	1.23	7.25

Commercial Aircraft

Short, Medium, and Long Range and Jumbo Jets

BAC/CONC	LTO		846.7	247.0	90.4	0.0	14.1		0.00	0.00	0.00	0.00	0.00
BAC111-40	LTO		103.4	72.4	15.0	1.5	1.7		0.00	0.00	0.00	0.00	0.00
707-320B	LTO		262.7	218.3	25.7	4.5	4.3		0.00	0.00	0.00	0.00	0.00
727-200	LTO	544	56.0	13.4	29.6	1.2	3.3		15.22	3.65	8.06	0.32	0.89
737-200	LTO	1,460	37.3	9.0	19.8	0.8	2.2		27.24	6.54	14.42	0.56	1.59
747-200B	LTO		259.6	96.9	82.4	5.2	7.2		0.00	0.00	0.00	0.00	0.00
747-200B	LTO	318	108.9	22.4	107.5	5.2	8.0		17.32	3.56	17.10	0.83	1.27
747-200B	LTO		66.8	10.0	124.9	0.0	7.5		0.00	0.00	0.00	0.00	0.00
L1011-200	LTO		61.1	7.5	93.7	0.0	5.6		0.00	0.00	0.00	0.00	0.00
L1011-100	LTO		199.4	138.4	64.3	0.0	4.9		0.00	0.00	0.00	0.00	0.00
DC8-63	LTO	48	262.7	218.3	25.7	1.2	3.3		6.30	5.24	0.62	0.03	0.08
DC9-50	LTO	52	37.3	9.0	19.8	0.8	2.2		0.97	0.23	0.51	0.02	0.06
DC10-30	LTO		116.9	47.1	48.9	0.2	5.0		0.00	0.00	0.00	0.00	0.00

Air Carrier Turboprops,Commuter,Feeder Line and Freighters

BEECH99	LTO		7.2	5.1	0.8	0.0	0.2		0.00	0.00	0.00	0.00	0.00
CONVAIR 5	LTO		24.4	9.8	21.7	0.0	0.9		0.00	0.00	0.00	0.00	0.00
CONVAIR 5	LTO	16	25.3	10.2	5.3	0.0	0.9		0.20	0.08	0.04	0.00	0.01
DEL TWIN	LTO		7.2	5.1	0.8	0.0	0.2		0.00	0.00	0.00	0.00	0.00
FAIRP27	LTO		36.3	22.4	0.9	0.0	0.6		0.00	0.00	0.00	0.00	0.00
GRUMMAN	LTO		7.2	5.1	0.8	0.0	0.2		0.00	0.00	0.00	0.00	0.00
HS 748A	LTO		7.3	0.6	1.0	0.0	0.2		0.00	0.00	0.00	0.00	0.00
L-188	LTO		48.8	19.6	43.3	0.0	1.8		0.00	0.00	0.00	0.00	0.00
L-100	LTO		48.8	19.6	43.3	0.0	1.8		0.00	0.00	0.00	0.00	0.00
METRO-2	LTO		6.3	7.7	1.2	0.5	0.2		0.00	0.00	0.00	0.00	0.00
SHORTS S	LTO	4,380	5.3	1.9	1.4	0.2	0.2		11.64	4.15	3.09	0.48	0.53

General Aviation Aircraft

Business Jets

CESSNA CI	LTO		19.5	6.7	2.0	0.0	0.4		0.00	0.00	0.00	0.00	0.00
CESSNA CI	LTO		18.7	6.7	2.0	0.0	0.4		0.00	0.00	0.00	0.00	0.00
DASSAULT	LTO		76.2	7.4	1.7	0.0	0.8		0.00	0.00	0.00	0.00	0.00

GATES LEA LTO		88.8	8.4	1.6	0.0	0.8	0.00	0.00	0.00	0.00	0.00
GATES LEA LTO		41.2	4.1	0.6	0.0	0.4	0.00	0.00	0.00	0.00	0.00
GATES LEA LTO	515	11.3	3.7	3.5	0.0	0.9	2.90	0.97	0.90	0.00	0.24
GATES LEA LTO		5.4	1.9	1.2	0.0	0.2	0.00	0.00	0.00	0.00	0.00
GULFSTRE LTO		48.1	36.0	5.2	0.5	0.7	0.00	0.00	0.00	0.00	0.00
GULFSTRE LTO		48.1	36.0	5.2	0.5	0.7	0.00	0.00	0.00	0.00	0.00
SHORELIN LTO		76.2	7.4	1.7	0.0	0.8	0.00	0.00	0.00	0.00	0.00
Business Turboprops (EPA Class P2)											
BEECH B99 LTO	438	7.2	5.1	0.8	0.0	0.2	1.57	1.11	0.18	0.00	0.04
CESSNA C LTO		6.3	7.7	1.1	0.4	0.2	0.00	0.00	0.00	0.00	0.00
DEHAVILAN LTO		7.2	5.1	0.8	0.0	176.4	0.00	0.00	0.00	0.00	0.00
SHORTS S LTO		6.4	8.4	0.9	0.5	0.2	0.00	0.00	0.00	0.00	0.00
SWEARING LTO		6.3	7.7	1.2	0.5	0.2	0.00	0.00	0.00	0.00	0.00
COMPOSIT LTO		7.16	5.1	0.8		0.2	0.00	0.00	0.00	0.00	0.00
General Aviation Piston (EPA Class P1)											
CESSNA 15 LTO		8.3	0.2	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
PIPER WA LTO		14.4	0.3	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
CESSNA S LTO		33.1	1.1	0.1	0.0	0.0	0.00	0.00	0.00	0.00	0.00
PIPER NAV LTO	803	96.2	1.8	0.0	0.0	0.0	38.64	0.71	0.01	0.00	0.00
SINGLE EN LTO		14.4	0.3	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00
COMP GA LTO	584	12.0	0.4	0.1		0.0	3.51	0.12	0.02	0.00	0.00
2 ENG PIS LTO		95.5	1.8	0.0	0.1	0.0	0.00	0.00	0.00	0.00	0.00
COMP AIR LTO		28.1	1.2	0.2		0.0	0.00	0.00	0.00	0.00	0.00
General Aviation Helicopt	294										
UH-1 LTO		1.5	2.5	1.2	0.0	0.2	0.00	0.00	0.00	0.00	0.00
						Total Civil	110.29	22.70	36.88	1.92	3.81
					Total All Aircraft		275.17	100.87	120.43	3.15	11.06

Table 3.4-3

ESTIMATED ANNUAL AIR POLLUTION EMISSIONS ASSOCIATED WITH BASELINE FLIGHT OPERATIONS AT BARNES MUNICIPAL AIRPORT

Aircraft	*Annual Flight Operations*[1]	*% of Total Operations*	----- ANNUAL EMISSIONS (METRIC TONS) -----				
			CO	*THC*[2]	NO_x[3]	PM_{10}	SO_2
Based A-10	6,448	6.9	46.683	8.299	4.251	2.920	0.362
Commercial	13,067	14.0	37.303	6.334	4.072	NDA[4]	0.487
General Aviation[5]	85,119	77.1	422.163	7.264	0.876	NDA[4]	0.256
Additional Military[6]	1,825	2.0	7.813	3.218	1.358	0.418	0.095
ANNUAL TOTALS	93,355		513.962	25.115	10.557	>3.338	1.200
Reported 1985 Emissions Inventory[7] for the ROI			342,134.0	146,315.7	75,149.4	48,927.1	40,824.9

Notes:

1. An operation can be defined separately as a departure, an arrival, and as the approach or climbout portion of a closed pattern. Source: HQ AFCESA/DMP.
2. THC = total hydrocarbons
3. NO_X = nitrogen oxides
4. NDA = No Data Available
5. Emissions contributions from general aviation operations at Barnes MAP differ substantially, in relation to reported annual operations, from emissions amounts related to general aviation operations at Bradley IAP. This is due solely to differences in the reported mix of aircraft types and operations comprising general aviation at the two airports.
6. Includes transient A-10 operations. Transient military operations occur seven days per week, versus five days for based military aircraft.
7. The 1985 emissions inventories are the most recent figures available from the EPA database and represent the last year for which a complete, nationwide inventory has been attempted.
8. Reported as "volatile organic compounds (VOC)."
9. Reported as "total suspended particulates (TSP)," of which PM_{10} is a component.

APPENDIX D-2

MASSPORT, TEN PARK PLAZA, BOSTON, MA 02116-3971, (617) 973-5500

massport

JB
10/15

Tom N.
10/22
John

October 12, 1993

Mr. John Mills
Department of Environmental Protection
10 Commerce Way
Woburn, MA 01801

Dear John:

Enclosed is the backup material on how Massport estimated the VOC losses from fuel storage and handling at Logan Airport. We would appreciate your comments.

If I can be of further assistance, please call me at (617)973-5389.

Sincerely,

Norman J. Faramelli
Director of Transportation &
Environmental Management

NORTHEAST REGIONAL OFFICE
DEP
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HANSCOM FIELD • BOSTON FISH PIER • COMMONWEALTH PIER

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From -
Logan Airport Emission Factor

Feb 1992

4. Fuel Storage and Handling

This section describes the hydrocarbon (or HC) emissions that result from the storage and handling of various types of fuels at Logan Airport. The presentation of the methods and the results are organized according to the major types of fuels used.

(A) Jet Fuel

The sources of HC emissions for storage and handling of jet fuel include breathing and working losses for above-ground storage tanks; working losses for underground storage tanks (or UST's); losses from the filling of tanker trucks, and the filling of aircraft tanks; and losses due to spillage in aircraft fueling, and from accidental spills.

(a) Above-Ground Tanks - Breathing Losses

From AP-4 Forms [24,25,26] submitted to the Massachusetts Department of Environmental Protection (or MDEP), a total of six above-ground tanks with a total storage capacity of 1.067 million gallons was identified. These tanks were assumed to be fixed roof type.

The breathing loss, or LB, in pounds per year (or lb/yr) is given by the following expression [27]:

$$LB = (0.0226)*MV*PT^{0.68}*D^{1.73}*H^{0.51}*\Delta T^{0.5}*FP*C*KC \qquad (4.1)$$

(i) MV is the vapor molecular weight for jet A fuel and is estimated at 128.

(ii) PT is a pressure term, and is defined as:

$$PT = PV/(PA-PV) \qquad (4.2)$$

Where PA = atmospheric pressure or 14.7 psia
and PV = true vapor pressure of jet A fuel, estimated at 0.1 psia [28].

(iii) D is the diameter of the tank. We estimated this to range from 30 ft for Butler/Exxon's tank of 126,000 gallon capacity to approximately 43.9 ft for a 270,000-gallon tank operated by American Airlines.

(iv) H is the average vapor space height and is assumed to be approximately one-half of the tank height. the H's used range from just under 4 ft for a 5,000-gallon tank to 13.9 ft for the 270,000-gallon tank.

(v) ΔT is the average diurnal temperature change in °F. Based on Logan Airport data compiled by the National Weather Service [29], this temperature change is estimated at 17° F.

(vi) FP is known as the paint factor. All tanks were assumed to be gray in color, and FP was therefore estimated at 1.33 [27].

(vii) C is the adjustment factor for small-diameter tanks. C was estimated at 0.62 for the 5000-gallon tank, and 1.0 for all the larger tanks.

(viii) KC is called the product factor. For jet A fuel, this factor was set to 1.0.

The breathing loss was estimated at 736 lb/yr for the 126,000 - gallon Butler tank, and 1,422 lb/yr for the 270,000-gallon American Airlines tank. The total breathing loss for the six tanks was estimated at 5,785 lb/yr or approximately 2,624 kg/yr.

(b) Above-ground Tanks - Working Losses

The working loss, or Li, in lb/yr from each tank is given by the following expression [27]:

$$Li = (2.4\times10^{-5})*MV*PV*KN*KC*Vi*Ni \qquad (4.3)$$

The working loss for all tanks combined, or LW, can be obtained with the following equivalent expression:

$$LW = (2.4\times10^{-5})*MV*PV*KN*KC*VT \qquad (4.4)$$

MV, PV, and KC are the vapor molecular weight, the vapor pressure, and the product factor, respectively. These parameters are defined in Sec. 4(A)(a) above.

(i) VT is the total throughput in gal/yr. The 1990 annual throughput reported for these six tanks was 140.6 million gallons. Because the data from the AP-4 forms were incomplete (that is not all tank owners or operators were reporting to the MDEP), this reported throughput amount was adjusted upward by a factor. This factor is represented by the ratio of an estimated 1990 throughput of 438 million gallons from Massport's study [30] and the 346.5 million gallons accounted for by the AP-4 forms. Applying this escalation factor of 1.26 to the AP-4 total, we arrived at a 1990 throughput of 177.7 million gallons for the above-ground tanks.

(ii) KN is the turnover factor and generally decreases with the number of turnovers per year. The number of turnovers per year is obtained by dividing the total throughput (or 1.777×10^8 gal/yr) by the total capacity (or 1.067×10^6 gal) or approximately 167. The corresponding KN from the AP42 document [27] is 0.35.

Using these parameters and Eqn. (4.4), the total working loss for the above-ground tanks was estimated at 8,668 kg/yr.

(c) Underground Storage Tanks - Working Losses

Because of the low vapor pressure of jet A fuel and the small temperature variation below ground, breathing losses from these UST's are quite negligible.

From the AP-4 forms, we identified a total of 40 UST's with a total capacity of 1.69 million gallons.

The working loss for all of these tanks combined, or LW, can again be obtained from Eqn. (4.4). MV, PV, KC have been previously estimated as 128, 0.1, and 1.0, respectively.

(i) VT is the total 1990 throughput. From the AP-4 forms, this throughput was reported as 205.9 million gal/yr. Because of under-reporting of the AP-4 forms, this throughput was again adjusted upward by the same 1.26 factor. The adjusted 1990 throughput for these UST's is 260.3 million gal/yr.

(ii) The number of turnovers per year is obtained by dividing the throughput of 260.3 million gal/yr by the total capacity of 1.69 million gallons. The resulting number of 154 turnovers per year yield a turnover factor, or KN, of 0.35.

Substituting these parameters into Eqn. (4.4), the total working loss for the UST's was estimated at 12,694 kg/yr.

(d) Filling of Tanker Trucks

Jet fuel is transferred to the aircraft either by a hydrant system or by tanker trucks. HC losses are incurred during the filling of these tankers. These losses may be estimated by the following expressions [27]:

$$L' = 12.46 * S * PV * MV / T^{\circ}R \qquad (4.5)$$

where L' = Loss in pounds per kilogal pumped (or lb/kgal)

(i) MV and PV are as defined previously at 128 and 0.1, respectively.

(ii) S is a saturation factor, and ranges from 0.5 for submerged loading of a clean tank to 1.45 for splash loading without vapor balance. For the purpose of this analysis, S was assumed to be 1.0.

(iii) $T^{\circ}R$ is the ambient temperature in degrees Rankine. Using July's average temperature of 75°F, $T^{\circ}R$ was therefore estimated at 535°R.

With these estimated parameters, the HC loss rate for filling of tanker trucks was estimated at 0.298 lb/kgal.

The total loss for filling of tank trucks is obtained by multiplying the loss rate with the throughput.

The fraction of fuel pumped through tanker trucks for Butler/Exxon in 1989 was approximately 29/45 or 0.64. Applying this ratio to the estimated 49.1 million gallons pumped by Butler/Exxon in 1990, we obtain 31.64 million gallons for tanker truck throughput. Total 1990 throughput for Page that was pumped through the tanker trucks was estimated at 59.44 million gallons. The total throughput of jet fuel by tanker trucks is therefore 31.64 + 59.44 or 91.08 million gallons or 91,075 kgal.

Therefore, the HC losses in 1990 was estimated at 0.298 lb/kgal * 91,075 kgal/yr, or 12,315 kg/yr.

(e) Filling of Aircraft Tanks

To estimate losses from the filling of aircraft tanks, it was assumed that the rate of loss is a function of throughput and that there are no controls in effect. Equation (4.4) from Sec. 4 (A)(b) is used to estimate this loss.

The vapor molecular weight, the vapor pressure, and the product factor are unchanged and are as defined in Sec. 4(A)(b).

The number of turnovers per aircraft tank is assumed to be less than 36; therefore, the turnover factor is set to 1.0.

The total throughput for 1990, made up of both above-ground tank and UST components, was estimated at 438 million gallons. And the total loss associated with the filling of aircraft tanks, or LA, is as follows:

$$LA = (2.45\text{x}10^{-5})*(128)*(0.1)*(1.0)*(1.0)*(4.38\text{x}10^{8})*(0.4536)$$
$$= 61{,}034 \text{ kg/yr.}$$

(f) Spillage During Tank Fill

Using average data from service stations dispensing motor gasoline, the ratio of losses due to spillage (from normal refueling process) and total uncontrolled displacement losses from vehicle refueling [27] is 0.7/11.0, or 0.0636.

Applying this ratio to the total losses from the filling of aircraft tanks (from Sec. 4(A)(e)), the losses due to spillage was estimated at 0.0636 * 61,034 or 3,882 kg/yr.

(g) Accidental Spill

Total accidental spill of fuel at Logan Airport in 1990 was reported at 3,745 gallons [18]. Of this amount, approximately 70% or 2,622 gallons is jet fuel and the rest is motor gasoline.

Using an average jet fuel density of 6.78 lb/gal (with specific gravity ranging from 0.775 to 0.830), the total loss of jet fuel spilled in 1990 was estimated at 17,774 lb.

Spilled fuel generally do not end up in the storm water system because Massport and other fuel operators use absorbing agents such as sand or 'Speedi-dry' to soak up the fuel. No emission factor data is currently available to quantify the losses due to evaporation of fuel during this whole process. For the purpose of this study, approximately 10% of the spilled motor gasoline is assumed to be lost to evaporation.

This 10% evaporation loss rate is adjusted to jet fuel according to the ratio of the true vapor pressures of these two fuels. The evaporation loss rate for jet fuel is estimated at (10%)*(0.1/6.8) or 0.147 %.

The losses due to accidental spills in 1990 is then obtained as follows:

(17,774 lb/yr)*(0.147/100)*(0.4536 kg/lb)

or 11.9 kg/yr.

(h) Results

the various components of jet fuel losses are summarized in Table 4.1. Uncontrolled losses associated with the filling of aircraft tanks are responsible for 60% of the total loss of 101,228 kg/yr in 1990.

(B) Aviation Gasoline

The sources of the HC losses for aviation gasoline (or AV gas) include breathing and working losses for one above-ground tank and one UST, losses due to the filling of tanker trucks and aircraft tanks, and losses from spillage.

(a) Above-ground Tank - Breathing Losses

There is only one 285-gallon tank with an estimated diameter of 4.6 ft, and an average vapor space height of 1.4 ft.

The true vapor pressure for av gas is estimated at 7 psia [31]; and the vapor molecular weight is estimated at 62.

Using Eqn. (4.1) and procedures described in Sec 4(A)(a), the breathing loss for this assumed fixed-roof tank in 1990 was estimated at:

$(2.26 \times 10^{-2})(62)(0.937)(14.014)(1.165)(4.123)(1.33)(0.25)(1.0)$

or 29.4 lb/yr, which is equivalent to 13.3 kg/yr.

(b) Above-ground Tank - Working Losses

The 1990 throughput for this tank was estimated at 1,003 gallons.

The number of turnovers for this tank was estimated at 3.5 and, therefore, the turnover factor was set equal to 1.0.

Using this throughput, Eqn. (4.3), and the procedures described in Sec. 4(A)(b), the working loss from this tank was estimated at 4.7 kg/yr.

Table 4.1

Logan Airport 1990 Hydrocarbons Emissions* From Storage and Handling of Fuels

Source Description	Jet Fuel	AV Gas	Motor Gas	Diesel	#2	#6	Slop	Glycol	Total
Above-Ground Tanks									
- Breathing	2,624	13	--**	--	<1##	--	--	178	2,816
- Working	8,668	5	--	--	<1	--	--	4	8,677
UST's#									
- Breathing	1,373	48	2,718	<1	--	--	<1	2	4,142
- Working	12,694	488	29,279	7	<1	<1	10	4	42,482
Tanker Truck Filling	12,315	478	--	--	--	--	--	34	12,827
Fueling Aircraft									
- Working	61,034	492	--	--	--	--	--	--	61,526
- Spillage	3,882	31	--	--	--	--	--	--	3,913

Table 4.1 (Cont'd.)

Source Description	Jet Fuel	AV Gas	Motor Gas	Diesel	#2	#6	Slop	Glycol	Total
Fueling Motor Vehicles									
- Working	--	--	6,910	3	--	--	--	--	6,913
- Spillage	--	--	1,903	<1	--	--	--	--	1,904
Accidental Spills	12	<1	285	--	--	--	--	--	297
Total	102,602	1,555	41,095	10	1	1	11	222	145,497

---

* Emissions are in kilograms per year (or kg/yr)

UST's stand for underground storage tanks

** '--' means not applicable

'<1' means less than 1 kg/yr; actual losses, however, are reflected in the total loss estimates (which are rounded to the nearest whole kg/yr).

(c) Underground Storage Tank - Breathing Losses

There is only one UST with a capacity of 20,000 gallons.

The true vapor pressure of av gas is approximately 70 times higher than that of jet fuel. Therefore, breathing losses from this UST was also taken into account.

To estimate the breathing losses, the breathing loss rate of 1.0 lb/kgal for service stations pumping motor gasoline [27] was adjusted according to the ratio of the true vapor pressures of these two fuels.

The 1990 throughput for this tank was 103,222 gallons. Therefore, the total breathing losses for this tank is obtained as follows:

(1.0 lb/kgal)*(7.0/6.8)*(103.22 kgal/yr)

or 106.3 lb/yr, which is equivalent to 48.2 kg/yr.

(d) Underground Storage Tank - Working Losses

The number of turnovers for this tank was estimated at 5.2, and the turnover factor at 1.0.

Using the 103,222-gallon throughput and the procedures from Sec. 4(a)(b), the working loss from this tank in 1990 was estimated at 1,075 lb/yr or 487.7 kg/yr.

(e) Filling of Tanker Trucks

Fueling of aircraft with av gas is done completely with tanker trucks.

Using the procedures described in Sec. 4(A)(d) and the following estimated parameters:

$S = 1.0$
$PV = 7.0$ psia
$MV = 62$
$T^{o}R = 535^{o}R$

and a 1990 throughput of 104,225 gallons (which is made up of 1,003 gallons for the above-ground tank and 103,222 gallons for the UST), the HC losses were estimated at 1,053 lb/yr or 477.9 kg/yr.

(f) Filling of Aircraft Tanks

Equation (4.4) and the procedures described in Sec. 4(A)(b) are used to estimate this loss. The vapor molecular weight, the vapor pressure, and the product factors used are 62, 7.0, and 1.0, respectively.

The number of turnovers per aircraft tank is assumed to be less than 36; therefore, the turnover factor is set to 1.0.

The total loss associated with the filling of aircraft tanks is estimated as follows:

$(2.45 \times 10^{-5})*(62)*(7.0)*(1.0)*(1.0)*(104,225)$ lb/yr

or 1,086 lb/yr, which is equivalent to 492.4 lg/yr.

(g) Spillage During Tank Fill

Using the procedures described in Sec. 4(A)(f) above, the losses due to this form of spillage was estimated at 0.0636 * 492.4 or 31.3 kg/yr.

(h) Results

Table 4.1 summarizes the various types of losses due to storage and handling of av gas. UST working losses and losses due to filling of tanker trucks and aircraft tanks contribute almost equally to the total 1990 loss of 1,556 kg/yr.

(C) Motor Gasoline

There are approximately twenty-four UST's, but no above-ground tanks, for motor gasoline storage at Logan Airport. The sources of HC losses consist of breathing and working losses for these 24 UST's, losses due to the refueling of motor vehicles, and losses due to spillage from routine refueling, and from accidental spillage.

(a) Underground Storage Tanks - Breathing Losses

Using a breathing loss rate of 1.0 lb/kgal (see Sec. 4(B)(c)) and an estimated total 1990 throughput of 5.993 million gallons, the total breathing losses for these UST's was estimated at 5,993 lb/yr or 2,718 kg/yr.

(b) Underground Storage Tanks - Working Losses

The average number of turnovers for these tanks was estimated at a little over 21. Hence, the turnover factor was set to 1.0.

The vapor molecular weight was assumed to be 66; and the vapor pressure for a July mean temperature of approximately 75°F was estimated at 6.8 psia. The product factor, as defined in Eqn. (4.3), was set to 1.0.

With these parameters and the throughput of 4.086 million gallons, the total working losses for these UST's in 1990 were estimated at:

$$(2.4 \times 10^{-5})*(66)*(6.8)*(1.0)*(1.0)*(5.993 \times 10^{6})$$

or 64,547 lb/yr, which is equivalent to 29,279 kg/yr.

(c) Refueling of Motor Vehicles

To estimate the losses due to refueling, the total throughput was disaggregated into three groups, viz: Massport, airlines, and other non-rental car; rental car companies; and the service station on the egress road. No controls were assumed for refueling activities in the first group. For rental cars and the service station, mandatory Stage II controls were assumed to be in effect.

1990 throughput for Massport, the airlines, and other non-rental car users, was obtained from MDEP's AP-4 forms. The throughput for this group was estimated at 872.8 kgal/yr. The uncontrolled emission rate of 11 lb/kgal [27] was used with this throughput to obtain a loss rate of 9,601 lb/yr or 4,355 kg/yr.

For the rental car companies, a 1990 throughput of 3,213 kgal/yr was estimated. A controlled emission rate of 1.1 lb/kgal, reflecting Stage II control efficiencies in the range of 88 to 92%, was assumed. The computed loss from this group was estimated at 3,534 lb/yr or 1,603 kg/yr.

The throughput for the service station for 1991 was 1.986 million gallons, Following estimated annual variations of jet fuel throughput for the same period, the corresponding 1990 throughput for this service station was estimated by reducing the 1991 total by 4%. This estimated throughput of 1,907 kgal/yr was then multiplied by the 1.1 lb/kgal emission rate to derive the 1990 losses of 2,097 lb/yr or 951 kg/yr.

The total losses from refueling of motor vehicles from these three groups add up to 6,910 kg/yr in 1990.

(d) Spillage During Tank Fill

The emission rate associated with routine refueling of motor vehicles is 0.7 lb/kgal [27]. With this emission rate and the 1990 throughput, the annual HC emissions from this source were estimated at 1,903 kg/yr.

(e) Accidental Spills

Of the total reported accidental spills of 3,745 gallons of fuel in 1990, approximately 30% (or 1,124 gallons) is motor gasoline.

Using an average density of 5.6 lb/gal, the total loss of motor gasoline spilled in 1990 was estimated at 6,292 lb.

Following the procedures described in Sec. 4(A)(g), approximately 10% of this spilled fuel is assumed to be lost to evaporation.

Therefore the total losses in 1990 due to accidental spills were estimated at 629 lb or 285 kg/yr.

(f) Results

The various components of HC losses due to storage and handling of motor gasoline at Logan Airport are exhibited in Table 4.1. Working losses from the UST's and losses from refueling of motor vehicles are the biggest components, accounting for 71 and 17% of the total losses, respectively.

(D) Diesel

The sources of HC for diesel include breathing and working losses for the UST's, losses associated with the fueling of service equipment, and with spillage in the fueling process. HC emissions from fuel combustion (for example, in emergency or standby electric generation and in snow melting) are addressed under the category of Other Miscellaneous Sources in Sec. 6.

(a) Underground Storage Tanks - Breathing Losses

There are no above-ground storage tanks for diesel storage at Logan Airport. There are 35 UST's with a total capacity of 100,900 gallons. Using the procedures described in Sec. 4(B)(c), and a 1990 throughput of 370.11 kgal/yr, the breathing losses for these UST's were estimated at:

(1.0 lb/kgal)*(0.013/6.8)*(370.11 kgal/yr)

or 0.71 lb/yr, which is equivalent to 0.32 kg/yr. The term, 0.013/6.8, is the ratio of the estimated vapor pressures of diesel to motor gasoline.

(b) Underground Storage Tanks - Working Losses

The average number of turnovers for these tanks is estimated at less than four per year. Therefore, the turnover factor to be used in applying Eqn. (4.4) is 1.0.

With an estimated throughput of 370,110 gallons/yr and the procedures from Sec. 4(A)(b), the working loss from these UST's in 1990 was estimated at approximately 15 lb/yr or 6.8 kg/yr.

(c) Refueling of Motor Vehicles

The emission rate due to the refueling of motor vehicles is based on the published uncontrolled rate for motor gasoline [27], adjusted according to the ratio of the true vapor pressures. This rate is estimated at:

(0.013/6.8) 11.0 lb/kgal)

or 0.02103 lb/kgal.

Of the 370,110 gallons of diesel used in 1990, approximately 44,150 gallons were used in supplemental space heating, 14,470 for emergency electric generation, and 44,210 for snow melting. Total non-automotive uses were, therefore, estimated at 102,830 gallons. The throughput associated with automotive use is the difference between 370,110 and 102,830 gallons, or 267,280 gallons.

With this throughput, the losses due to the refueling of motor vehicles is therefore estimated at:

(0.02103 lb/kgal)(267.28 kgal/yr)

or 5.6 lb/yr, which is equivalent to 2.6 kg/yr.

(d) Spillage During Tank Fill

The emission rate for spillage losses is based on motor gasoline's 0.7 lb/kgal and adjusted according to the ratio of the vapor pressures. The adjusted emission rate for diesel spillage losses is 1.338 x 10^{-3} lb/kgal.

With this spillage emission rate and a throughput of 267.28 kgal/yr, the total 1990 losses due to spillage was estimated at 0.2 kg/yr.

(E) Distillate Fuel No. 2

There are presently two above-ground tanks and 2 UST's storing No. 2 fuel at Logan Airport. This fuel is used for supplemental space heating. The losses associated with the storage and handling of this fuel include breathing and working losses for the above-ground tanks, and working losses for the UST's. Because of the low vapor pressure and small throughput, breathing losses for the UST's are quite negligible. HC emissions from combustion of this fuel are addressed in Sec. 6, Other Miscellaneous Sources.

(a) Above-Ground Tanks - Breathing Losses

There are two 300-gallon tanks which are assumed to be fixed roof. Each of these tanks was estimated to have a diameter of approximately 4.7 ft, and an average vapor space of 1.4 ft.

The true vapor pressure for this distillate fuel was estimated at 0.0105 psia [27], and the vapor molecular weight at 130.

With these parameters and Eqn. (4.1), the breathing losses for each of these tanks were estimated at 0.49 lb/yr. Therefore, total losses for the two tanks in 1990 were approximately 0.5 kg/yr

(b) Above-Ground Tanks - Working Losses

The 1990 throughput for the above-ground tanks was estimated at 16,936 gallons.

The average number of turnovers for these two tanks is a little over 28 per year. The associated turnover factor is therefore set to 1.0.

With this throughput and Eqn. (4.3), the working losses from these tanks were estimated at 0.3 kg/yr.

(c) Underground Storage Tanks - Working Losses

The throughput for the UST's was estimated at 15,038 gal/yr for 1990.

The average number of turnovers for these two 6,000-gallon tanks was estimated at 1.3. The turnover factor was therefore set to 1.0.

With the 15,038-gallon throughput and the procedures from Sec. 4(A),(b), the working losses from these UST's were estimated at 0.2 kg/yr.

(F) Residual Fuel No. 6

There are presently two UST's storing No. 6 fuel at Logan Airport. This fuel is used by the central power plant only.

Because of the vary low vapor pressure (estimated at 7.5 x 10^{-5} psia) breathing losses from these UST's are negligible. HC emissions from combustion of this fuel are addressed in Sec. 6, Other Miscellaneous Sources. Therefore, the only loss that need to be addressed here is working loss for these UST's.

(a) Underground Storage Tanks - Working Losses

The two UST's have a total capacity of 150,000 gallons, and a 1990 throughput of 856,162 gallons.

The average number of turnovers for these tanks was estimated at 5.7, and the turnover factor was set to 1.0. The vapor molecular weight and the product factor were set to 190 and 1.0, respectively.

With these parameters, and the 856,162-gallon throughput, the total working losses for these UST's were estimated at 0.1 kg/yr.

(G) Slop Fuel

This fuel category represents somewhat of a catch-all for various waste products. Slope fuel is broadly delineated into two groups: (1) bad slop which includes fuel from the oil/water separators and other contaminated fuels; and (2) good slop, which is virtually very close to the original pure fuel. Both virgin and waste motor oils are not included in this category. For the purpose of the emissions estimation, this slop fuel is assumed to have the properties of jet fuel.

There are presently six UST's (and no above-ground tank) storing this fuel. The total capacity of these tanks is estimated at 8,900 gallons, and the 1990 throughput at 73,230 gallons.

(a) Underground Storage Tanks - Breathing Losses

Assuming a true vapor pressure of 0.1 psia, the total breathing losses for these two UST's were estimated at:

(1.0 lb/kgal)*(0.1/6.8)*(73.23 kgal/yr)

or 1.1 lb/yr, which is equivalent to 0.5 kg/yr.

(b) Underground Storage Tanks - Working Losses

The average number of turnovers for these UST's was estimated at 8.2; and the turnover factor was therefore set at 1.0.

With these parameters and the procedures described in Sec. 4(A) (b), the working losses for these UST's was estimated at 10.2 kg/yr.

(H) Glycol

According to reported AP-4 forms from the MDEP, there are three above-ground tanks and nine UST's that are used to store glycol. Both ethylene and propylene glycol are used (mixed with hot water and urea) to de-ice aircraft and runways in the winter.

The HC losses discussed here include breathing and working losses for both the above-ground tanks and the UST's. Other losses (for example, due to the filling of the tanker trucks and from the spraying of the glycol mixture) which are limited to winter conditions, are addressed in Sec. 6, Other Miscellaneous Sources.

(a) Above-Ground Tanks - Breathing Losses

The three above-ground tanks have capacities of 17,500, 17,500, and 10,000 gallons. The diameters were estimated at 18.1 ft for the bigger tanks and 15 ft for the smaller tank. The average vapor space height for the larger tanks was estimated at 5.3 ft, and for the smaller tank, at 4.4 ft. These tanks were assumed to be fixed roof.

Using Eqn. (4.1) and the procedures described in Sec. 4(A)(a), the breathing losses for these three tanks were estimated at 69, 69, and 40 kg/yr, for a combined total of 178 kg/yr.

(b) Above-ground tanks - Working Losses

The 1990 throughput for the above-ground tanks was estimated at 49,724 gallons.

The average number of turnovers for these tanks was estimated at 1.1. The turnover factor was set at 1.0.

To estimate the working losses, an average temperature of 40°F (representative of winter conditions) was used. The corresponding vapor pressure assumed was 0.2 psia.

With these parameters and a throughput of 49,724 gallons, the 1990 working losses for these tanks were estimated at 4.3 kg/yr.

(c) Underground Storage Tanks - Breathing Losses

There are nine UST's for glycol with a total capacity of 78,000 gallons. The total 1990 throughput for these UST's was estimated at 46,767 gallons.

The breathing losses for these tanks were estimated from the loss rate for motor gasoline and adjusted according to the ratio of the vapor pressures of these two liquids. The vapor pressure for ethylene glycol for an average annual temperature of approximately 53°F was estimated at 0.5 psia. Therefore, the total breathing losses from these UST's were obtained as follows:

(1.0 lb/kgal)*(0.5/6.8)*(46.767 kgal/yr)

or 3.4 lb/yr, which is equivalent to 1.6 kg/yr.

(d) Underground Storage Tanks - Working Losses

The average number of turnovers for these tanks is less than one. The turnover factor was set to 1.0.

Using the 46,767-gallon throughput and the procedures from Sec. 4(A)(b), the total working losses from these UST's were estimated at 4.1 kg/yr.

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APPENDIX E

BIOGENICS

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APPENDIX F

QUALITY ASSURANCE REPORT

PES
PACIFIC ENVIRONMENTAL SERVICES, INC.

APPENDIX F

4700 Duke Drive, Suite 150
Mason, Ohio 45040
(513) 398-2556
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August 10, 1992
A628-000

Mr. Thomas McCusker
Control Technology and Compliance Section
Air, Pesticides & Toxics Management Division
U.S. Environmental Protection Agency, Region I
JFK Federal Building, APC
Boston, MA 02203

Dear Mr. McCusker:

Enclosed is a copy of the draft report Quality Assurance for the Massachusetts Inventory for Assignment No. 1-128, "Quality Assurance for the Massachusetts Draft Emission Inventory," under Contract 68D00124. Please contact me if you would like to discuss this report or any aspect of the assignment.

Sincerely,

PACIFIC ENVIRONMENTAL SERVICES, INC.

P. Roger Cawkwell

P. Roger Cawkwell
Project Manager

Enclosures

pc: W. L. Caviness, Jr.
Contracting Officer (MD-33)
Mary C. Wilkins
Project Officer (MD-15)

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APPENDIX

DRAFT REPORT

QUALITY ASSURANCE FOR THE MASSACHUSETTS DRAFT EMISSIONS INVENTORY

Prepared for:

U.S. Environmental Protection Agency,
Region I
JFK Federal Building, APC
Boston, MA 02203

August 1992
A628.000

Prepared by:

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QUALITY ASSURANCE FOR THE MASSACHUSETTS DRAFT EMISSIONS INVENTORY

BACKGROUND

The Commonwealth of Massachusetts, Department of Environmental Protection (DEP), Division of Air Quality Control (DAQC) utilizes a database system for point source emissions of airborne contaminants. This database is called the Stationary Source Enforcement Inventory System (SSEIS) or DAQC-SSEIS. This inventory system is used by the DAQC to provide the policy makers with local, regional and State level data. It also allows the Division to monitor the effectiveness of existing and new air pollution control measures. The DEP, DAQC developed State Registration Forms to collect information from major sources for the 1990 State Implementation Plan (SIP) inventory. Major sources are point sources that emit more than 10 tons per year (TPY) of volatile organic compounds (VOC), 50 TPY of nitrogen oxides (NO_x), or 100 TPY of carbon monoxide (CO). Information from these Source Registration Forms was entered into DAQC-SSEIS. This information was confirmed by actual inspection of the major facilities (sources) by division personnel. In some cases, direct measurement of the concentration of the waste stream was compared with the submitted data to ensure the accuracy of the information on the Source Registration Form.

The DAQC-SSEIS database is maintained on an IBM 3270 Computer located at the OMIS Datacenter in Boston. A vast number of users at the Massachusetts DEP have access to the computer network system which contains the DAQC-SSEIS. To ensure security of the DAQC-SSEIS system, each user has an assigned user identification and password to access the DEP's computer network and an assigned user identification and password to change records within DAQC-SSEIS. Information contained within DAQC-SSEIS was used to create the SIP Air Pollutant Inventory Management Subsystem (SAMS) which, in turn, was used to develop the 1990 SIP Inventory.

The U.S. Environmental Protection Agency (USEPA), Region I approved the Inventory Preparation Plan for the Massachusetts 1990 Base Year Emission Inventory. In addition, the USEPA approved the Quality Assurance Plan for the Massachusetts 1990 Base Year Inventory.

GENERAL EVALUATION

PES personnel visited the offices of the Commonwealth of Massachusetts, DEP during the week of July 20 through July 24. PES reviewed the draft SIP emissions inventory for CO and ozone precursors. This included reviewing the Massachusetts 1990 Base Year Emission Inventories document, the SAMS database, the DAQC-SSEIS database, outputs by plant from the DAQC-SSEIS, and spreadsheets used to calculate area sources. The purpose of the review was to provide Quality Assurance on the draft inventory, which contains stationary sources, area sources, and mobile sources. In addition to employing various DEP databases, PES reviewed plant records containing activity data from the DAQC-SSEIS database.

PES personnel performed Level I and Level II Quality Assurance Review using USEPA guidance specified in Quality Review Guidelines for 1990 Base Year Emission Inventories; Quality Assurance Program for Post-1987 Ozone and CO State Implementation Plan Emission Inventories; and Guidance for the Preparation of Quality Assurance Plans for Ozone/CO SIP Emission Inventories."

PES personnel reviewed the Massachusetts Draft Inventory to ensure that all source categories are covered in the point, area, and mobile source sections. In addition, PES personnel reviewed QA/QC documentation as well as point, area, and mobile source documentation. The overall rating determined for the Massachusetts Draft Inventory is that the inventory is complete, but documentation for some of the area sources and the mobile source category could be improved. The final inventory will include improved area and mobile source documentation. There was not enough time to present all of the area and mobile source documentation in the draft inventory.

DAQC-SSEIS INTERNAL QA/QC PROCEDURES

The SSEIS Database has a number of quality control procedures. For many plant codes such as AQCR, UTM, Regional Planning Area, and fuel characteristics (i.e., ash content, fuel content, and heating value), the SSEIS will accept only valid codes. For instance, UTM coordinates must fall within a certain range. Similarly, fuel characteristics such as ash content, sulfur content, and heating values (organized by Source Category Code (SCC)) must also fall within certain maximum and minimum values. In addition, AQCR and regional planning area codes must have valid entries. Stack heights must also be within a certain range. Source Industrial Classification (SIC) codes are automatically checked for their validity. The control equipment codes are compared with the SCC code to ensure correct selection of control equipment codes. The DAQC-SSEIS has other programmed verification edits, such as checks for control efficiency values. Furthermore, Chemical Abstract Service (CAS) numbers are linked to SCC codes to provide users with data on chemicals emitted from each process.

GENERAL QA/QC PROCEDURES

Point source emissions are calculated by using process rate information from the plant and applying the appropriate emission factors. Each SCC code is linked to the appropriate emission factor so that if an SCC code is known, the emission factor will automatically be entered. Point source emissions entered into the DAQC-SSEIS are verified. The DAQC-SSEIS database has verification audits to determine if emissions from categories are unreasonably low or high. Point source emissions are crosschecked with National Toxic Release Inventory System (TRIS) and industrial trade journals. In addition, verbal checks with agency's supplying activity were performed. SAMS QA procedures were run for the Draft Massachusetts Inventory.

LEVEL I QA REVIEW

A Level I QA review was performed on the draft Massachusetts CO, VOC and NO_x emissions inventory. The purpose of this review was to assess compliance with the minimum requirements of the emissions inventory guidance. The CO, NO_x, and VOC emissions inventory meets the minimum requirements of the emissions inventory guidance. Documentation of the emissions inventory needs some minor improvements. The list of compounds exempt from the VOC definition needs to be updated (p.I-10). Four classes of perfluorocarbons have been added to the list of exempt compounds. These four classes are: cyclic, branched, or linear, completely-fluorinated alkanes; cyclic, branched, or linear, completely- fluorinated ethers (with no unsaturations); cyclic, branched, or linear, completely-fluorinated tertiary amines (with no unsaturations); and sulfur-containing perfluorocarbons (with no unsaturations and with sulfur bonds only to carbon and fluorine). Several area sources need better documentation. Emissions from asphalt roofing kettles are not included in the area source documentation or in the worksheet used to calculate emissions (see Table 1). Vehicle refueling and spillage emissions are typically determined from MOBILE 4.1. Review of the mobile source methodology revealed that gasoline refueling was accounted for in the area source emissions.

The MOBILE 4.1 model was used to generate emission factors for the different vehicle classes and speeds. The Massachusetts Highway Department estimated vehicle miles travelled (VMT), by roadway functional class for 1990. This estimate was made using Highway Performance Monitoring System (HPMS) procedures. VMT data was allocated from state to county using the methodology described in Mobile Source Volume IV July 1989 Guidance[1]. However, review of the MOBILE4.1 outputs indicates that the MOBILE4.1 model generated vehicle refueling emission factors for 1990. Area source emissions from charcoal grilling and firefighting training and testing were not estimated since emission factors for these categories are not available.

Non-road mobile sources were estimated using the methodology in Volume IV. Non-road mobile source emissions will be replaced with the estimates from USEPA's study on on-road mobile sources when these estimates become available from Office of Mobile Sources (OMS). Massachusetts will review inventory when final guidance is issued from OMS.

LEVEL II QA REVIEW

A Level II QA Review was performed on the Massachusetts Inventory. Level I and Level II QA review check lists are presented in Appendix B. A completeness check of the VOC point source inventory indicated that plants in the 10 to 25 TPY listings were not represented in the following categories:

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[1] EPA Interim Guidance for Procedures for Emission Inventory Preparation Volume IV: Mobile Sources. Technical Support Div., OAQPS RTP, NC, and Emission Control Technology Div. Office of Mobile Sources, Ann Arbor, Michigan 450/4-81-026d July 1989 and February 1992.

TABLE 1. EMISSION INVENTORY 1990 BY SUBCATEGORIES

CATEGORY	ACTIVITY FACTOR	SOURCE	METHOD	VOC TPSD	NOX TPSD	CO TPSD
A.STATIONARY POINT SOURCES	Fuel/materials	Source Registration Site Inspection	SSEIS Database	84.16	297.824	31.79
B.STATIONARY AREA SOURCES						
B.1 WASTE TREATMENT						
POTW'S	Wastewater flow-indus	DEP/BWP/IWM, EPA-NPDES	Ind.Flow *EF	11.50		
TSDF'S	Wastewater flow-indus	DEP/BWP/IWM, EPA-NPDES	Ind.Flow *EF	9.66		
MSW Landfills	Refuse tonnage 1985-90	DEP/BWP/SOLID W.MGT	LAEM Model	54.40		
B.2 GASOLINE DISTRIBUTION						
T.Truck Unloading	Gasoline Sales	DOT/FHWA-Hway Stat/DOR	Act Fac *EF	8.24		
Under.Tank Breath	Gasoline Sales	DOT/FHWA-Hway Stat/DOR	Act Fac *EF	3.52		
Tank Truck Transit	Gasoline Sales	DOT/FHWA-Hway Stat/DOR	Act Fac *EF	0.53		
Aircraft Refueling	Gasoline Sales-Aviation	DOE Petro.Mark Annual	Act Fac *EF	0.28		
Petro Vessel Unload	Fuels unloaded tons-gal	Waterborne Comm.US ACE	Act Fac *EF	12.14		
B.3 SMALL STATIONARY SOLVENT EVAPORATION						
Dry Cleaning	Employment SIC 72	Census CBP, SSEIS Emis	Empl *EF -EM	30.00		
Degreasing	Per Capita	Census of Pop, SSEIS	Pop * EF -EM	26.07		

TABLE 1. EMISSION INVENTORY 1990 BY SUBCATEGORIES (CONTINUED)

CATEGORY	ACTIVITY FACTOR	SOURCE	METHOD	VOC TPSD	NOX TPSD	CO TPSD
Surf.coat						
N.ind Architectur	Per Capita	Census of Pop	Pop * EF	53.08		
N.ind Auto Refin	Employment SIC 7532	Census CBP, SSEIS Emis	Empl *EF -EM	42.07		
N.ind traff.paint	Per Capita	Census of Pop	Pop * EF	4.12		
Ind.Surf Coat						
Furn & Fixt	Employment SIC 25	Census CBP, SSEIS Emis	Empl *EF -EM	9.17		
Metal Cont.	Per Capita	Census of Pop, SSEIS	Empl *EF -EM	12.41		
New Autos	Employment SIC 3711	Census CBP, SSEIS Emis	Empl *EF -EM	3.37		
Machine & Eqpt	Employment SIC 35	Census CBP, SSEIS Emis	Empl *EF -EM	9.69		
Appliances	Employment SIC 363	Census CBP, SSEIS Emis	Empl *EF -EM	0.43		
Transport Eqpt	Employment SIC 37 ex3,11	Census CBP, SSEIS Emis	Empl *EF -EM	0.81		
Sheet Str/Coil	Employment SIC 3479	Census CBP, SSEIS Emis	Empl *EF -EM	6.37		
Factory F.Wood	Employment SIC 242-5,9	Census CBP, SSEIS Emis	Empl *EF -EM	0.83		
Electric Insul	Employment SIC 3357,3612	Census CBP, SSEIS Emis	Empl *EF -EM	3.27		
Oth.Prod.Coat	Per Capita	Census of Pop	Popul *EF-EM	6.13		

TABLE 1. EMISSION INVENTORY 1990 BY SUBCATEGORIES (CONTINUED)

CATEGORY	ACTIVITY FACTOR	SOURCE	METHOD	VOC TPSD	NOX TPSD	CO TPSD
H.Perf.Maint	Per Capita	Census of Pop	Popul *EF-EM	8.18		
Marine Coat	Employment SIC 373	Census CBP, SSEIS Emis	Empl *EF -EM	1.08		
O.Sp.Purp.Coat	Per Capita	Census of Pop	Empl *EF -EM	8.18		
Graphic Arts	Per Capita	Census of Pop	Empl *EF -EM	11.88		
Asphalt Paving	Tons Cutback & Emulsif.	Asphalt Institute -Md	Act Fac *EF	1.06		
Comm/cons Solvent use	Per Capita	Census of Pop	Popul *EF	60.74		
Pesticides						
Agricultural	Acre.pest/herb use/crop	Umass/DEP-ORS Study 85	Pest*1.45*.9	2.44		
Non Agricultural	Pest/herb use/acreage	Ma Food&Agr-Harrison	Pest*1.45*.9	0.68		
Miscellaneous Solvents						
Organic Chem.store	Employment/emiss SIC 28	Census CBP, SSEIS Emis	Scale-up	9.25		
Bioprocess -Bakery	Employ/emiss SIC 546,205	Census CBP, SSEIS Emis	Scale-up	6.00		
Catastro.Release	Fuel/solv spill quantity	DEP-DHW,US Coast Guard	Quantity *EF	0.09		
B.4 SMALL STATIONARY FUEL COMB.& FIRES						
Bit.Coal	Quantity Coal tons	DOE Energy Info Admin	Quantity *EF	0.03	2.62	1.06

TABLE 1. EMISSION INVENTORY 1990 BY SUBCATEGORIES (CONTINUED)

CATEGORY	ACTIVITY FACTOR	SOURCE	METHOD	VOC TPSD	NOX TPSD	CO TPSD
Anthracite Coal	Quantity Coal tons	DOE Energy Info Admin	Quantity *EF	0.01	0.193	0.03
Distillate Oil	Quantity Barrels to gals	DOE Energy Info Admin	Quantity *EF	0.14	2.12	2.42
Residual Oil	Quantity Barrels to gals	DOE Energy Info Admin	Quantity *EF	0.11	2.08	0.84
Natural Gas	Quantity N.Gas B.cu ft	DOE Energy Info Admin	Quantity *EF	0.55	5.68	3.94
Woodburning Stoves	Quantity cords to tons	MA Div.Forest & Parks	Quantity *EF	0.00	0	0
Woodburning Fireplace	Quantity cords to tons	MA Div.Forest & Parks	Quantity *EF	0.00	0	0
Kerosine	Quantity Oil gallons	DOE Energy Info Admin	Quantity *EF	0.09	1.38	0.3
Liquid Petro Gas	Quantity Barrels to gals	DOE Energy Info Admin	Quantity *EF	0.03	1.08	0.25
Wood Products	Quantity Tons	MA Div.Forest & Parks	Quantity *EF	0.97	1.94	30.53
Forest & Agric. Fires	Acres Burned	MA Div.Forest & Parks	Acres * EF	0.37	0.062	2.19
Structural Fires	Fires *6.8 Tons material	MA DPS-Fire Marshall	Fires*tons*EF	3.05	0.39	16.64
S.Waste Incineration	Per Capita	Census of Pop	Popul * EF	8.57	1.87	10.734
C.	ON ROAD MOBILE SOURCES					
1 L.Duty Gas.Veh	VMT, Speed, Mob4.1 EF	MHD,AIRS,LCD,Mob4.1	VMT Vehicle	182.80	120.76	1296.15

TABLE 1. EMISSION INVENTORY 1990 BY SUBCATEGORIES (CONTINUED)

CATEGORY	ACTIVITY FACTOR	SOURCE	METHOD	VOC TPSD	NOX TPSD	CO TPSD
2 L.Duty Gas Trucks 1	VMT, Speed, Mob4.1 EF	MHD,AIRS,LCD,Mob4.1	& road class*	58.08	43.87	457.85
3 L.Duty Gas Trucks 2	VMT, Speed, Mob4.1 EF	MHD,AIRS,LCD,Mob4.1	season factor	37.28	24.61	248.62
4 H.Duty Gas.Veh	VMT, Speed, Mob4.1 EF	MHD,AIRS,LCD,Mob4.1	* Mob4.1 EF	31.26	33.65	356.45
5 L.Duty Dies.Veh	VMT, Speed, Mob4.1 EF	MHD,AIRS,LCD,Mob4.1	by Speed	0.50	2.19	1.16
6 L.Duty Dies.Trucks	VMT, Speed, Mob4.1 EF	MHD,AIRS,LCD,Mob4.1		0.15	0.56	0.29
7 H.Duty Dies.Veh	VMT, Speed, Mob4.1 EF	MHD,AIRS,LCD,Mob4.1		16.24	211.47	73.25
8 Motorcycles	VMT, Speed, Mob4.1 EF	MHD,AIRS,LCD,Mob4.1		5.81	1.32	20.2
D.	NON ROAD MOBILE SOURCES					
Aircraft Emissions currently	being updated using new EPA emissions model					
Comm/civil/milit Aircraft	Engine type LTO'S/A'PORT	FAA * MA Aeron Comm	Engine LTO*EF	6.71	5.85	54.54
Railroad locomotives						
Line Haul	Diesel Fuel Use	Rail Co,ICC.Rail Plan	Fuel * EF	0.49	11.323	1.438
Switchyard	Operating Switchyard Loco	Rail Co,ICC	# Sw.Loco*EF	0.21	2.125	0.377
Marine Vessels						
Recreational	Regis.Inboard/out engines	RMV Law Enforcement	Est Fuel * EF	42.17	3.08	140.06

TABLE 1. EMISSION INVENTORY 1990 BY SUBCATEGORIES (CONTINUED)

CATEGORY	ACTIVITY FACTOR	SOURCE	METHOD	VOC TPSD	NOX TPSD	CO TPSD
Commercial	Trips/drafts/fuel/underw	Army Corps Engineers	Est Fuel * EF	0.76	5.83	1.37
Millitary	Trips/drafts/fuel use	US Coast Guard	Est Fuel * EF	0.02	0.09	0.02
Off Highway Vehicles		(Latest)				
Farm Eqpt	Farm eq * Ann.fuel gas&d	Census Agric, Vol.IV	Est Fuel * EF	2.43	6.11	45.72
Construction Eqpt	Empl SIC-16/Nat.Emp-HPRS	CBP, Vol.IV	HPRS/FUEL *EF	7.34	40.29	95.15
Industrial Eqpt	SIC-10-14,20-39,50/1 ,,	CBP, Vol.IV	HPRS/FUEL *EF	9.53	18.35	167.18
Off-High M.Cycles	MC * 700 VMT/YR	RMV Lic/Law Enforcmnt	MC VMT * EF	0.50	0.011	1.83
Lawn & Garden Eqpt	NEDS Fuel Off-HW 20% Mass	NEDS 1985 Vol.IV,Censu	Fuel * EF	5.78	0.59	54.49
Snowmobiles	Snowmobiles reg	RMV Lic/Law Enforcmnt	Unit/YR * EF	0	0	0
E. BIOGENICS	Land use / Nat.default	EPA, NOAA Met.data	Sate Met.	655.04		

commercial/institutional boilers; industrial boilers; gasoline bulk plants; degreasing operations; and waste disposal. However, plants in the 10 to 25 TPY category were represented in the following categories: industrial surface coating; consumer/commercial solvent use; adhesives; and commercial bakeries.

Similarly, review of 25 percent of listed point sources with CO emissions greater than 100 TPY indicated that only four point sources did not have hourly process rates. All other information was complete.

The methodology used to define the ozone season is not described in the inventory documentation. The ozone season is defined as April 15 to September 15.

Rule effectiveness of 80 percent was applied to all regulated sources designated by the USEPA with certain exceptions. Rule effectiveness values were either 80 percent or N/A. Rule effectiveness of 80 percent was applied to truck unloading (Stage I).

A subset of the 10 percent (every 10th record beginning with the third record) of the point source inventory of plants emitting more than 25 TPY was reviewed to determine if data were compiled and presented for the following: plant name and location; NEDS Point ID; SIC code; operating schedule; applicable regulations; emission limitations; compliance year; SCC code for process unit; daily process rate and units; control equipment; overall control efficiency; emission estimation method; annual nonbanked emissions; rule effectiveness; seasonal adjustment factor; and ozone season daily emissions. In addition, checks were performed to determine if emission factors, SIC codes, SCC codes, and process rates were reasonable. For 10 percent of the sources, all of this information was presented except daily process rate. This value was not presented in SAMS since these sources were mostly solvent usage and only annual solvent usage numbers are provided. Similarly for the CO emissions inventory, 25 percent (every third record beginning with the third record) of the emissions inventory with CO emissions greater than 100 TPY had a complete inventory listing, except for daily process rates which were not generally available. The list of plant records reviewed is presented in Appendix A.

Procedure checks were performed on the area sources. The following area sources were estimated using per capita emission factors: degreasing-cold cleaners; architectural surface coating; graphic arts; commercial/consumer solvent use; waste disposal combustion; and open burning combustion. Dry cleaning emissions were developed using employee emission factors. Open burning combustion emissions estimates were developed using activity data from the Massachusetts Department of Safety. Per capita emission factors are the preferred method for estimating dry cleaning and open burning emissions estimates. The use of employee emission factors for determining dry cleaning emissions is acceptable. Activity data for estimating open burning combustion estimates is an acceptable method if the emission factor has been documented.

The quantity of gasoline transported in tank trucks was used to estimate tank truck unloading (Stage I) emissions. The seasonal throughput adjustment factor of 1.25 was not used in this estimate. This is reasonable since

Massachusetts is one of the smallest states in the country and there is very little need for the intermediary transfer of gasoline between terminals and gas stations. Gasoline usage is adjusted by 1.05 to account for transfer from bulk plants to terminals. Summer daily emissions were calculated by multiplying the yearly emissions by 0.2659 and dividing by 92.

VOC emissions from pesticides were based on a study by University of Massachusetts and Massachusetts DEP.

A consistency check of the area sources revealed that several area source categories were either higher or lower than what would be expected on a per capita basis. These values are listed in Table 2. Dry cleaning emissions were developed using employee emission factors rather than a per capita basis. Dry cleaning emissions on a per capita basis are much higher than would be expected. Point source emissions were subtracted from the area source category estimates to avoid double counting of emissions.

TABLE 2. CONSISTENCY CHECKS FOR AREA SOURCES

Area Source Category	VOC Range lbs/person	Calculated VOC lbs/person
Tank Trucks in Transit	0.011 - 0.017	0.061
Autobody Refinishing	7.55 - 17.05	3.6
Dry Cleaners	1.12 - 1.5	3.1
Graphic Arts	0.6 - 0.8	1.0
Asphalt Paving	0.16 - 8.47	0.13
Municipal Waste Landfills	0.12 - 0.31	6.6
Pesticide Application	0.003 - 0.017	0.22

Procedure checks were made on the on-road mobile sources. The daily VMT estimates, by roadway class and county, were provided by the Massachusetts Highway Department. VMT estimates by vehicle-type are not yet available. The VMT data was divided into six roadway types. These roadway types are: interstate; other freeway; other principal arterial; major collector; minor collector; and local. The minor arterial roadway class has not been included. VMT, by roadway apportionment, did not fall into the expected levels since VMT was not apportioned to the minor arterial category.

Procedure checks were made on area non-road mobile sources. Emissions estimates for railroad locomotives were based on Massachusetts Bay Transportation Authority (MBTA) and other local and State railway companies. The quantity of fuel used by railway locomotives was not available from Department of Energy (DOE). The recommended method for calculating total emissions in an inventory area requires multiplying a fleet-averaged emission factor by fuel consumption. The USEPA recognizes that railroad operations may vary significantly from the national average and that some state and local air quality agencies may have access to more detailed information regarding the locomotive activity in their inventory area. Local or State agencies with more detailed information are not required to follow the tailoring methods. Aircraft activity was determined from FAA Air Traffic Activity and supplemented with Massachusetts Aeronautics Commission-Airport System Plan (MASP). Emissions estimates for Marine vessels were based on Volume IV rather than on the DOE's Energy Data Reports.

Consistency checks were made on area non-road mobile sources. All the non-road mobile source categories had per capita emissions below the expected range, except for industrial machinery and lawn and garden, which were equal or above the expected range. These values are listed in Table 3.

The on-road mobile source completeness check indicated that the VMT/registered vehicle was within the expected range of 9,181 to 12,426 using USEPA data. However, using 1990 Polk data, the annual index of the VMT/registered vehicle falls below the range at 8,074. Waiver rates and compliance rates for MOBILE 4.1 are from the quarterly inspection data (compliance rate of 85%, waiver rate 1%). Gasoline RVP of 9.0 are used for summer RVP in 1990. The RVP used is based on existing USEPA regulations. The winter RVP used in MOBILE4.1 is 13.5. However, MOBILE4.1 does not model effects of RVP on exhaust for fuel volatility greater than 11.7 psi. No documentation was provided in the inventory for the use of RVP, compliance rates, or waiver rates. VMT was adjusted for winter and summer seasons based on previous studies. Temperature inputs to MOBILE4.1 were based on the 10 worst ozone days for summer. Temperature inputs to MOBILE4.1 were based on the 10 worst CO days for winter.

Biogenic emissions were calculated using the PC-Biogenic Emissions Inventory System (PC-BEIS). The date selected for the biogenic emissions was August 14, 1988, the fourth hottest day of the ten highest ozone season days in the last three years. Biogenic emissions were calculated in accordance with USEPA guidelines.

RECOMMENDATIONS

1) The list of compounds exempt from the VOC definition needs to be updated (i.e., perfluorocarbons).
2) The MOBILE4.1 inputs should be documented in the final inventory. The use of RVP, waiver rates, and compliance rates should also be documented. Furthermore, the calculation and documentation for Stage II emissions should be presented in the inventory.
3) The emissions inventory should list categories subject to rule effectiveness (Ken Santlal of the DEP, DAQC stated that only Stage I had 80% rule effectiveness).
4) A summary table listing area and point source emissions by source category should be presented in the inventory.
5) Indicate in the inventory documentation why emissions for area sources such as charcoal grilling and firefighting training were not determined.

TABLE 3. NON-ROAD MOBILE SOURCES

Category	VOC range	Calculated VOC lbs/person	CO range	Calculated CO lbs/person	NOx Range	Calculated NOx lbs/person
Agricultural Equipment	0.27 - 6.39	0.19	5.14 - 122.80	3.61	0.69 - 15.70	0.48
Non-Road Construction Equipment	1.12 - 5.35	0.76	17.42 - 83.02	9.87	4.85 - 23.23	4.18
Industrial Machinery	0.30 - 0.81	0.99	7.7 - 19.7	17.3	0.85 - 2.15	1.90
Non-road Motorcycles	0.12 - 0.51	0.047	0.45 - 1.88	0.17	0 - 0.012	0.0010
Lawn and Garden Equipment	0.005 - 0.051	0.54	0.047 - 0.479	5.1	0.001 - 0.005	0.055

6) Document in the Inventory why VMT estimates for minor arterial roadway class were not determined.
7) Indicate in the Inventory, area source categories that were determined using alternative estimation methods (non-EPA methods).

AUDITING PROBLEMS

The SAMS database was not designed to audit consecutive individual point and segment sources within a plant record. There is no easy way to view consecutive point sources within a plant record. The user must scroll through several levels of screens to view information concerning consecutive point sources. There is no easy way to get a list of plant sources by emission cutoff (e.g., plants > 100 TPY). In addition, SAMS (version 4.2) makes changes to files (saves files) when changes are not wanted. The SAMS database program will not allow entry of a blank value for emissions at the segment level. Occasionally, this is a problem since some point sources are not operating from year to year. Users have to enter a dummy variable, e.g., 0000007, to complete the plant record. The SAMS database is currently being revised to correct these deficiencies.

Appendix A

Review of Point Sources

APPENDIX

TABLE A-1. VOC SOURCES CHECKED FOR COMPLETENESS AND REASONABLENESS

Plant Name	County	AQCR	Plant ID
Acushnet Co.	0295	120	0038
American Tissue Mills	2645	118	0141
Autom. Rolls of NE	2645	118	0548
Bee Fiberglass Inc.	0295	120	0803
Bradford Industries	1325	121	0087
Canal Electric Co.	0155	120	0054
CL Hauthaway & Sons	1325	119	0300
Compugraphic Corporation	1325	119	1267
Craig Systems	0539	121	0364
Decorative Specialties Corp.	0801	042	0175
Eastern Etching & Mfg.	0801	042	0149
Exxon Company	1325	119	0484
Flexcon Company	2645	118	0078
The Gillettte Co.	0539	121	0063
Graphics Tech International	0801	042	0193
Hazen Paper Company	0801	042	0128
Ideal Tape Co.	1325	121	0036
International Paper	1325	121	0765
L.H. Daloz, Inc.	2205	119	1818
Low-Temp Engineering	0295	120	0046
Mann Industries Inc.	1325	119	1314
Middlesex Research	1325	119	0496
Modern Electroplating	2205	119	0347
National Coating Co.	1825	119	2431
New England Power Co.	0295	120	0061
The October Co., Inc.	0815	042	0558
PCI G.P. Inc. J.C. Rhod.	0295	120	0152
Polyclad Laminates	2645	118	0455
R & G Manufacturing	0539	121	0058

TABLE A-1. VOC SOURCES CHECKED FOR COMPLETENESS AND REASONABLENESS (Continued)

Plant Name	County	AQCR	Plant ID
Rex Finishing	0539	119	0178
Semline Inc.	1555	119	1234
Spalding Sports World	0801	042	0014
Starensier Inc.	0539	121	0223
Supatco	0539	119	1376
Terkelsen Molding Co.	1555	119	1176
U.S. Ring Binder Corp.	0295	120	0157
Vicon Recovery Assoc.	0195	117	0004
Westaco U.S. Envelope	0801	042	0775
Wright Line Inc.	2645	118	0104

TABLE A-2. CO SOURCES CHECKED FOR COMPLETENESS AND REASONABLENESS

PLANT/POINT ID	COUNTY
BOSTON EDISON-MYSTIC STATION	Suffolk Co
FALL RIVER DPW INCINERATOR	Bristol Co
VICON RECOVERY ASSOC.	Berkshire Co
WHEELABRATOR - MILLBURY	Worcester Co
MONTAUP ELECTRIC CO	Bristol Co
ALTRESCO - PITTSFIELD	Berkshire Co
LOWELL COGEN CO.	Middlesex Co

Appendix B

Level I and Level II QA Review Check Lists

APPENDIX

NK- Not Known

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-1. LEVEL I QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
1.1	**INVENTORY OVERVIEW**			
1.1.1	Is the nonattainment area to which the inventory is applicable defined?	✓		
1.1.2	Has the correct nonattainment classification (Marginal, Moderate, Serious, Severe, or Extreme) been indicated for the inventory area?	✓		
1.1.3	Are individual counties represented in the inventory identified?	✓		
1.1.4	Has the 25-mile inventory requirement zone outside of the nonattainment area been defined and included in the inventory?	✓		
1.1.5	Have each of the following pollutants been included in the inventory for each source type where it is applicable?			
	- Volatile Organic Compounds (VOC)	✓		
	- Nitrogen Oxides (NOx)	✓		
	- Carbon Monoxide (CO)	✓		
1.1.6	Are tables of summary emission totals provided that are specific to each pollutant for the inventory area?			Helpful to have a summary table for TPY as well as TPSD
	- Volatile Organic Compounds (VOC)	✓		
	- Nitrogen Oxides (NOx)	✓		
	- Carbon Monoxide (CO)	✓		
1.1.7	Are tables of summary emission totals provided for each pollutant on a county-specific basis?			TPY, TPSD
	- Volatile Organic Compounds (VOC)	✓		
	- Nitrogen Oxides (NOx)	✓		TPY, TPSD

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-1. LEVEL I QUALITY REVIEW CHECKLIST

	- Carbon Monoxide (CO)	✓		TPY, TPSD, TPWD
1.1.8	Is the calendar year basis for the baseline inventory specified?	✓		
1.1.9	Have each of the following source types been addressed in the inventory?			
	- Stationary Point Sources (SPS)	✓		
	-Stationary Area Sources (SAS)	✓		
	- On-Road Mobile Area Sources (OMAS)	✓		
	- Non-Road Mobile Area Sources (NMAS)	✓		
1.1.10	Specify the percent contribution of each of the source types listed in 1.1.9 to the total inventory emissions for VOC, NO_x, and CO. (TPSD) VOC(%) NO_x(%) CO(%) - SPS 9.1 31.6 1.0 - SAS 46.7 12.0 2.2 - OMAS 36.0 46.5 78.8 - NMAS 8.2 9.9 18.0			
1.1.11	Do the emissions estimates for VOC, NO_x, and CO reflect seasonal and weekday adjustments?	✓		
1.1.12	Have adjustments been made to the VOC emissions estimates to reflect the non-reactive compounds that cannot be counted as VOC emissions for the purpose of SIP attainment inventories?	✓		p. I-10, 4 classes of perfluoro-carbons are not included in VOC definition (exempt compounds)
1.1.13	Have all existing regulatory requirements for each source type been identified?	✓		
1.1.14	Has rule effectiveness and rule penetration been factored into emission estimates where appropriate?	✓		

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW

TABLE A-1. LEVEL I QUALITY REVIEW CHECKLIST

1.2	**POINT SOURCES**			
1.2.1	Have all VOC point sources with actual emissions equal to or greater than 10 tons/yr been included in the inventory?	✓		Inventory Specialists reviewed Trade Journals to determine if new industries (or companies) should be included: Reviewed: Yellow Pages, Assoc. Industry of Massachusetts, Regional Industrial Buying Guide, Existing Air Permits are reviewed by Air Group responsible for Inventory.
1.2.2	Have process, point, and segment level data been provided for all VOC point sources with actual emissions equal to or greater than 10 tons/yr?	✓		
1.2.3	Have all VOC sources in the 25-mile zone outside of the nonattainment area with emissions greater than 100 tons/yr been addressed in the inventory?	✓		
1.2.4	Have all NO_x and CO sources in the nonattainment area and 25-mile zone outside of the nonattainment area with emissions greater than 100 tons/yr been addressed in the inventory?	✓		
1.2.5	Have all process, point, and segment level documentation data required for the 100 ton NO_x and CO sources been provided?	✓		
1.3	**AREA SOURCES**			
1.3.1	Have each of the following major categories of non-mobile area source emissions been addressed in the inventory? - Gasoline Distribution - tank truck unloading	✓		
	- vehicle refueling	✓		
	- underground tank breathing	✓		
	- tank trucks in transit	✓		
	- Dry Cleaning - coin-operated	✓		
	- commercial	✓		
	- industrial	✓		
	- Degreasing - cold cleaning	✓		

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-1. LEVEL I QUALITY REVIEW CHECKLIST

1.3.1 cont'd	- on-site incineration	✓		
	- open top vapor	✓		
	- conveyorized	✓		
	- Surface Coating - architectural	✓		
	- auto refinishing	✓		
	- Graphic Arts	✓		
	- Cutback Asphalt Paving	✓		
	- Asphalt Roofing Kettles/Tankers		✓	
	- Pesticide Application	✓		
	- Commercial/Consumer Solvent Use	✓		
	- Waste Management Practices - publicly owned treatment works (POTW's)	✓		
	- hazardous waste treatment, storage, and disposal facilities (TSDF's)	✓		
	- municipal landfills	✓		
	- industrial wastewater treatment	✓		
	- open burning	✓		
	- Commercial Bakeries	✓		
	- Leaking Underground Storage Tanks	✓		Included in catastrophic/Accidental Releases
	- Stationary External Combustion - residential (coal, oil, gas, wood)	✓		
	- commercial (coal, oil, gas, wood)	✓		
	- industrial (coal, oil, gas, wood)	✓		
	- Natural Sources			(Biogenic Sources)
	- Forest Fires	✓		

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-1. LEVEL I QUALITY REVIEW CHECKLIST

1.3.1 cont'd	- Structure Fires	✓		
	- Slash Burning	✓		
	- Agriculture Burning	✓		
	- Orchard Heaters activity level		✓	Not used in Massachusetts
1.3.2	Are all area source emissions estimates documented by providing the emission factor and used and the sources of these data?	✓		
1.3.3	Where appropriate, have point sources contributions been subtracted out from area source category estimates?	✓		
1.3.4	Where appropriate, has rule effectiveness and rule penetration been reflected in emission estimates?	✓		
1.4	**MOBILE SOURCES**			
1.4.1	Have all of the following on-road vehicle classes been addressed in the inventory? - light-duty gasoline vehicles (LDGV)	✓		
	- light-duty gasoline trucks up to 6000 lbs (LDGT1)	✓		
	- light-duty gasoline trucks from 6000-8500 lbs (LDGT2)	✓		
	- heavy-duty gasoline vehicles (HDGV)	✓		
	- light-duty diesel vehicles (LDDV)	✓		
	- light-duty diesel trucks (LDDT)	✓		
	- heavy-duty diesel vehicles (HDDV)	✓		
	- motorcycles (MC)	✓		
1.4.2	Has EPA's MOBILE4.1 model been used to estimate on-road vehicle mobile source emission factors? (Exception: California can continue to use the EMFAC mobile model)	✓		

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-1. LEVEL I QUALITY REVIEW CHECKLIST

1.4.3	Has information been provided to document how on-road vehicle mobile source emissions estimates were determined using MOBILE4.1?	✓		
1.4.4	Is information provided to document how each of the following MOBILE4.1 inputs was derived?			
	- tampering rates	✓		MOBILE4.1 Default
	- vehicle miles traveled by vehicle type	✓		MOBILE4.1 default, MHD info. will be in final Inv.
	- annual mileage accumulation rates and registration distribution by vehicle type and age	✓		MOBILE4.1 default, MHD info will be available for final inventory
	- inspection and maintenance programs		✓	I/M -1983, 12% stringency, 1% waiver rate
1.4.4 cont'd	- anti-tampering programs	✓		MOBILE4.1 Default
	- ASTM volatility class (N/A)	✓		No longer used in MOBILE4.1
	- minimum and maximum daily temperature	✓		
	- base Reid Vapor Pressure (RVP)	✓		
	- In-use RVP and in-use start year	✓		
	- altitude region	✓		
	- calendar year	✓		
	- speed	✓		
	- ambient temperature	✓		
	- operating modes	✓		
1.4.5	If a procedure other than the MOBILE4.1 model was used to generate emission factors, was the procedure identified and documented?	N/A		
1.4.6	Are VMT estimates documented by any of the following methods?			
	- urban transportation planning model inputs and outputs are provided		✓	
	- traffic count program data are provided		✓	

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-1. LEVEL I QUALITY REVIEW CHECKLIST

1.4.6 cont'd	- fuel consumption data are provided		✓	
	- Highway Statistics data are provided along with the algorithms used to disaggregate the data to the county level		✓	Highway Statistics not provided, MHD disaggregated data to county level
	- the methods used to grow previous year VMT data to the base year are provided	N/A		
	- State/local program data are provided	✓		MHD VMT data by road class + speed
	- other (specify in Comments)			
1.4.7	If an urban transportation planning model was used, has a map of the transportation network input been included with the documentation?	N/A		
1.4.8	Have all of the following non-road vehicle classes been addressed in the inventory?			
	- farm equipment	✓		
	- construction equipment	✓		
	- industrial machinery	✓		
	- lawn and garden equipment	✓		
	- snowmobiles	✓		
	- aircraft	✓		
	- railroad locomotives	✓		
	- marine vessels	✓		
1.4.9	Was MOBILE4.1 used to estimate emissions for non-road mobile sources? (California may continue using EMFAC model).		✓	
1.4.10	If MOBILE4.1 was not used, are the emission calculation procedures documented by providing the following parameters?			
	- the emission factor used	✓		
	- the source of the emission factor	✓		

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-1. LEVEL I QUALITY REVIEW CHECKLIST

1.4.10 cont'd	- the activity level used	✓		
	- the source of the activity level	✓		
1.5	QUALITY ASSURANCE PROCEDURES			
1.5.1	Were quality assurance efforts carried out during the development of the inventory?	✓		
1.5.2	If yes, are these efforts documented in the submitted inventory or an accompanying plan?	✓		
1.5.3	If a quality assurance program was used (Question 1.5.1 is answered yes), were the following activities performed?			
	- measures taken to ensure that the point and area source lists were complete	✓		
	- alternate emission estimation procedures were considered		✓	
	- the accuracy of the data collected as inputs to the emissions estimation procedures were checked	✓		
	- calculations were reviewed to identify errors	✓		
	- the reasonableness of the resulting emission estimates was evaluated	✓		
	- an independent audit of the inventory was conducted	N/A		
	- other (please specify)			

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APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.1	**COMPLETENESS CHECKS - POINT SOURCES**			
2.1.1	Does the inventory include point sources for VOC in the 10-25 tpy (actual) range?	✓		
2.1.2	Are the following VOC point source categories represented among the 10-25 tpy plant listings?			The inventory includes VOC point sources from: Industrial Surface coating, Con/Comm. Solvent Use, Adhesives, & Commercial Bakeries.
	- Graphic Arts	✓		
	- Commercial/institutional boilers		✓	
	- Industrial boilers		✓	
	- Gasoline Bulk Plants		✓	
	- Degreasing Operations		✓	
	- Waste disposal/treatment		✓	
2.1.3	Are the following broad source categories represented among the >25 tpy VOC plant listings?			
	- Storage, Transportation and Marketing of Petroleum Products and Volatile Organic Liquids	✓		
	- Industrial Processes	✓		
	- Industrial Surface Coating	✓		
2.1.4	Are the following CO and NO_x source categories represented among the plant listings?			
	- Utility Boilers	✓		
	- Industrial Boilers	✓		
	- Commercial/Institutional External Fuel Combustion	✓		
	- Waste Disposal/Combustion	✓		

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.2	**PROCEDURES CHECKS - POINT SOURCES**			
2.2.1	Does the inventory documentation describe the methodology used (i.e., survey, plant inspections, AFS/NEDS, permit files, etc) to develop the point source inventory listing?	✓		
2.2.2	Does the point source inventory reflect a base year of 1990?	✓		
2.2.3	Were emission estimates adjusted to reflect the ozone season and rule effectiveness?	✓		
2.2.4	Does the inventory documentation describe the methodology used to define the ozone season?		✓	Ozone Season not defined April 15 through September 15
2.2.5	Indicate which of the following basic options were used to submit data for point sources. - SAMS Version 3.1			
	- SAMS Version 4.0	✓		SAMS version 4.2
	- AFS Batch Transaction Format			
	- Interactive direct entry to AFS			
2.2.6	Was EPA's Surface Impoundment Modeling System (SIMS) used to estimate emissions from waste treatment/disposal sources?			
2.2.7	Was rule effectiveness applied to emission estimates for the following point source categories? - Surface Coating of Cans	✓		N/A
	- Surface Coating of Metal Coils	✓		N/A
	- Surface Coating of Fabric and Vinyl	✓		N/A or 80%
	- Surface Coating of Paper Products	✓		N/A or 80%
	- Coating of Automobiles and Light Duty Trucks in Assembly Plants	✓		NOT IN INVENTORY

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.2.7 cont'd	- Surface Coating of Metal Furniture	✓		80% or N/A
	- Surface Coating of Magnetic Wire	✓		N/A
	- Tank Truck Gasoline Loading Terminals	✓		N/A
	- Bulk Gasoline Plants	✓		N/A
2.2.8	Was a rule effectiveness factor of 80 percent used for all categories?	✓		N/A or several categories
2.2.9	Does the point source inventory documentation include the contact person(s)for referring questions?	✓		indicates inventory Coordinator and Project manager
2.2.10	Select a subset which represents at least 10% of the listed point sources (in the > 25 TPY range) and determine if the following data are compiled and presented for each of these sources? (Note: Identify in the comment column the record numbers of those plants that were checked). - Plant Name and Location			39 Plants with 401 point Sources were reviewed.
	- NEDS Point ID	✓		
	- SIC Code	✓		
	- Operating Schedule	✓		
	- Applicable Regulations	✓		
	- Emission Limitations (only if subject to SIP Reg)	✓		
	- Compliance Year (only if subject to SIP Reg)	✓		
	- SCC Code for Process Unit	✓		
	- Daily Process Rate and units		✓	[298 of 401 point sources do not have daily process rate info. Most of these sources are solvent usage and surface coating operations]
	- Control Equipment	✓		
	- Control Efficiency	✓		
	- Emission Estimation Method	✓		
	- Emission Factor	✓		

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APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.2.10 cont'd	- Annual Nonbanked emissions	✓		
	- Rule Effectiveness	✓		
	- Seasonal Adjustment Factor	✓		
	- Ozone Season Daily Emissions	✓		
2.3	CONSISTENCY CHECKS - POINT SOURCES			
2.3.1	Does the sum of emission estimates from small VOC point sources represent at least 5 percent of the total point source VOC contribution?	✓		
2.3.2	If point source VOC emissions are attributed to organic chemicals manufacture (SOCMI), are fugitive leaks also quantified? (Fugitive equipment leak emissions should be 1-10 times larger than emissions from vents reactors etc.)	✓		Included in Other Category
2.3.3	Are unadjusted annual emission estimates for VOC, CO and NO_x from point sources within 25% of the values reported in AFS (or NEDS)?	NK		
2.4	COMPLETENESS CHECKS - AREA SOURCES			
2.4.1	Does the inventory contain VOC area source emission estimates for the following source categories.			
	- Service Stations: Tank Truck Unloading	✓		
	- Service Stations: Vehicle Refueling	✓		
	- Service Stations: Tank Breathing Losses	✓		
	- Service Stations: Tank Trucks in Transit	✓		
	- Architectural Coatings	✓		
	- Auto Refinishing	✓		
	- Solvent Metal Cleaning-Cold Cleaners	✓		
	- Dry Cleaning-Coin-operated	✓		(Dry Cleaning : one entry for

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.4.1 cont'd	- Dry Cleaning-Commercial	✓		(Coin-operated, commercial, and industrial)
	- Dry Cleaning-Industrial	✓		
	- Graphic Arts	✓		Rotogravure
	- Cutback Asphalt	✓		
	- Consumer/Commercial Solvent Use	✓		
	- Municipal Waste Landfills	✓		
	- Municipal Wastewater Treatment	✓		
	- Pesticide Application	✓		
	- Stationary External Combustion	✓		(Coal, Fuel Oil, Nat. Gas, LP Gas)
	- Structure Fires	✓		
	- Biogenic Sources	✓		
2.4.2	Does the inventory contain CO and NO_x area source emission estimates for the following stationary source categories?			
	- Industrial Boilers	✓		
	- Commercial Boilers	✓		
	- Waste Disposal Combustion	✓		
	- Open Burning	✓		
	- Structure Fires	✓		
2.5	PROCEDURES CHECKS - AREA SOURCES			
2.5.1	Were area VOC emissions estimates for the following categories developed using per capita emission factors?		✓	Employee Emission Factor SIC 7215 & 7216 → 2210 lb/yr
	- Dry Cleaning			SIC 7211-3 & 7217-9 → 1090 lb/yr
	- Degreasing-Cold Cleaners	✓		4.3 lb/person/yr

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.5.1 cont'd	- Architectural Surface Coating	✓		4.6 lb/yr - Seasonal Adj. Factor 1.4
	- Graphic Arts	✓		1.3 lb/yr
	- Commercial/Consumer Solvent	✓		6.3 lb/yr
	- Waste disposal combustion (including CO and NO_x estimates)	✓		Industrial Incineration based on # of employees, Residential & Comm. based on pop.
	- Open burning combustion (including CO and NO_x)	✓		Not Allowed During Ozone Season
	- Structure fires (including CO and NO_x)		✓	E.F. 6.8 TONS/fire, Activity Data - Mass Dept. of Safety.
2.5.2	Were gasoline throughput values (for estimating VOC emissions from service stations) obtained from one of the following sources: State Fuel Tax offices, State or Local Transportation Agencies, or the Federal Highway Administration publication Highway Statistics?	✓		Massachusetts Department of Revenue
2.5.3	If submerged filling or balance filling practices were assumed for tank truck unloading, was the prevalance of each filling technique derived based on local survey data?	✓		Berkshire County, 95% submerged, 5% splash based on telephone survey All
2.5.4	If truck unloading (Stage I) or vehicle refueling (Stage II) controls were assumed to be in place, was rule effectiveness applied in the emission calculations?	✓		80% Rule Effectiveness
2.5.5	Were the estimates of the quantity of gasoline transported (for use in estimating VOC emissions from tank trucks in transit) based on 1.25 times the area-wide gasoline throughput?		✓	Summer Adjustments based on gasoline Sales of June, July & Aug from Highway Statistics
2.5.6	Were VOC emission estimates from automobile refinishing derived using one of the following approaches: survey of local body shops or auto painting businesses, or use of employee counts in SIC 7531 and 7535? ← (1977 SIC Codes)	✓		(SIC 7532 ← 1987 SIC Code)
2.5.7	Was information on cutback asphalt usage derived from one of the following sources: State or Local higway department, highway contractors, or annual reports developed by the Asphalt Institute?	✓		

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.5.8	Were the industrial wastewater flow estimates (used for estimating VOC emissions from POTWs) determined by one of the following methodologies: actual survey of industrial contribution to POTW flow, or use of the default value of 16 percent of total POTW flow?	✓		
2.5.9	Were VOC emission estimates from pesticide use based on information obtained from Local, State or Federal Departments of Agriculture?		✓	Univ. Mass / DEP Study - for Agriculture Harrison Biotech, Inc + DFA - non-agriculture
2.5.10	Was EPA's Biogenic Emission Inventory System (BEIS) used to estimate VOC emissions from biogenic sources?	✓		
2.6	**CONSISTENCY CHECKS - AREA SOURCES**			
2.6.1	Are annual VOC emission estimates for tank truck unloading between 0.1 and 6.1 lbs/person?	✓		0.95 lbs/person
2.6.2	Are annual VOC emission estimates for vehicle refueling between 0.60 and 6.24 lbs/person?	N/A		
2.6.3	Are annual VOC emission estimates for tank breathing loses between 0.33 and 0.53 lbs/person?	✓		0.41 lbs/person
2.6.4	Are annual VOC emission estimates for tank trucks in transit between 0.011 and .017 lbs/person?		✓	0.061 lbs/person
2.6.5	Are annual VOC architectural coating estimates between 3.5 and 4.6 lbs/person?	✓		4.6 lbs/person
2.6.6	Are annual VOC emissions estimates for autobody refinishing estimates between 7.55 and 17.05 lbs/person?		✓	3.6 lbs/person
2.6.7	Are annual VOC emission estimates for cold cleaning degreasers between 2.3 and 3.0 lbs/person?	✓		2.7 lbs/person
2.6.8	Are VOC emission estimates from perchloro-ethylene-based dry cleaners between 0.79 and 1.05 lbs/person?		✓	Total 3.1 lbs/person
2.6.9	Are VOC emission estimates from petroleum-based dry cleaners between 0.33 and 0.45 lbs/person?		✓	
2.6.10	Are VOC emissions from the graphic arts industry between 0.6 and 0.8 lbs/person?		✓	1.0 lbs/person

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.6.11	Are VOC emissions from cutback asphalt paving between 0.16 and 8.47 lbs/person?		✓	0.13 lbs/person.
2.6.12	Are annual VOC emission estimates from municipal waste landfills between 0.12 and 0.31 lbs/person?		✓	6.6 lbs/person.
2.6.13	Are annual VOC emission estimates from publicly owned treatment works (POTWs) between 0.37 and 1.1 lbs/person?	✓		1.0 lbs/person
2.6.14	Are annual VOC emission estimates from pesticide application between 0.003 and 0.017 lbs/person?		✓	0.22 lbs/person.
2.7	**COMPLETENESS CHECKS - AREA ON-ROAD MOBILE SOURCES**			
2.7.1	Were all MOBILE4.1 input values documented?	✓		
2.7.2	Does the documentation describe the derivation of all non-default MOBILE4.1 input values?	✓		
2.8	**PROCEDURES CHECKS - AREA ON-ROAD MOBILE SOURCES**			
2.8.1	Were MOBILE4.1 defaults for tampering rates used?	✓		
2.8.2	If alternative tampering rate values were used, did EPA review and approve the survey on which the data were based?	N/A		
2.8.3	Are estimates of vehicle miles travelled (VMT) provided that are: - road-type specifice?	✓		
	- vehicle-type specific?		✓	Not yet available from Mass. Highway Dept
2.8.4	Were MOBILE4.1 default values for annual mileage accumulation rates, and registration distribution by vehicle type and age used?	✓		~~for~~ Draft Inventory MOBILE defaults, MHD values for Final Inventory.
2.8.5	Was the July ASTM volatility class used for estimating ozone season gasoline RVP?	N/A		
2.8.6	Were the MOBILE4.1 default values used to define percent of VMT by operating mode?	✓		

TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.8.7	Does the documentation describe how VMT estimates were developed if the transportation network input to the urban trasnportation model did not include rural and/or all urban roads in the inventory area?	N/A		
2.9	**CONSISTENCY CHECKS - AREA ON-ROAD MOBILE SOURCES**			
2.9.1	Was the value used for average summertime temperature between 80 and 93°F?	✓		
2.9.2	Were maximum and minimum temperature estimates (for computing evaporative VOC emissions) within a range of 24°F or less?		✓	(26°F ΔT=) Max : 94°F Min : 68°F
2.9.3	Was the average assumed speed between 2.5 and 55 mph?	✓		Speeds ranged from 20-60 mph.
2.9.4	Was the VMT by road type apportionment within the following ranges?			
	- Interstate: Between 13.3 and 27.7 percent of total VMT?	✓		27.0
	- Other Freeway and Expressway: Between 0 and 9.7 percent of total VMT?		✓	12.9
	- Other Principal Arterial: Between 10.5 and 29.2 percent of total VMT?	✓		24.6
	- Minor Arterial: Between 11.7 and 24.3 percent of total VMT?	N/A		
	- Major Collector: Between 7.1 and 19.7 percent of total VMT?	✓		7.0
	- Minor Collector: Between 0.6 and 3.9 percent of total VMT?		✓	14.9
	- Local: Between 2.6 and 45.4 percent of total VMT?	✓		13.6
2.9.5	Is the calculated annual index of VMT/person within the 1505 to 18991 range?	✓		7,700
2.9.6	Is the calculated annual index of VMT/gal gasoline sold, within the range of 15.9 to 20.7?	✓		19.0

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.10	**COMPLETENESS CHECKS - AREA NON-ROAD MOBILE SOURCES**			
2.10.1	Does the inventory contain VOC, CO and NO_x emission estimates for the following non-road sources?			
	- Construction Equipment	✓		
	- Industrial Machinery	✓		
	- Motorcycles	✓		
	- Lawn and Garden equipment	✓		
2.11	**PROCEDURES CHECKS - AREA NON-ROAD MOBILE SOURCES**			
2.11.1	Was information on the population of agricultural equipment items within the inventory area collected using data from the Census of Agriculture?	✓		
2.11.2	Was the number of acres cultivated in each county in the inventory area used to apportion agricultural equipment fuel used?	✓		
2.11.3	Were VOC, CO and NO_x emission estimates derived for the agricultural equipment category?	✓		
2.11.4	Were emission calculations performed separately for combines, balers, harvesters, general purpose machines, and tractors?	✓		
2.11.5	Were emissions estimates from agricultural equipment adjusted to reflect seasonal activity levels?	✓		90% of equipment used in 214 days (growing season)
2.11.6	Were local employment statistics for SIC 16 used to estimate the number of pieces of heavy construction equipment in the inventory area?	✓		
2.11.7	Were emission calculations performed separately for the following equipment types?			
	- Tracklaying tractors (diesel)	✓		
	- Tracklaying loaders (diesel)	✓		
	- Motor ~~scrapers~~ graders (diesel and gas)	✓		

APPENDIX A - OZONE NONA NMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.11.7 cont'd	- Scrapers (diesel)	✓		
	- Non-road trucks (diesel)	✓		
	- Wheel tractors (diesel and gas)	✓		
	- Rollers (diesel and gas)	✓		
	- Wheel dozers (diesel)	✓		
	- Miscellaneous construction equipment (diesel and gas)	✓		
2.11.8	Were local employment statistics for SIC codes 10-14, 20-39, and 50-51 used to estimate the number of industrial engines in use in the inventory area?	✓		
2.11.9	Were VOC, CO and NO_x emission calculations performed for the following industrial engine categories? - Heavy duty diesel	✓		
	- Heavy duty gasoline	✓		
	- Light duty gasoline	✓		
2.11.10	Were non-road motorcyle count estimates based on the number of motorcycles registered for on-road use?	✓		
2.11.11	Were VOC, CO and NO_x emission calculations performed for non-road motorcycle use?	✓		
2.11.12	Was the NEDS Fuel Use Report used to estimate the amount of fuel used annually in lawn and garden equipment?	✓		
2.11.13	Was lawn and garden fuel use apportioned by small engine type (2-cycle and 4-cycle)?	✓		
2.11.14	Were VOC, CO and NO_x emissions calculated for each lawn and garden engine type?	✓		
2.11.15	Were emission estimates from lawn and garden equipment adjusted to reflect seasonal activity levels?	✓		1.3 seasonal factor

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.11.16	Was aircraft landing and take-off activity determined from FAA Air Traffic Activity or Airport Activity Statistics of Certified Route Air Carriers?	✓		Supplemented with MASP data
2.11.17	Were emission estimates for railroad locomotives based on quantity of fuel used as recorded in DOE's Energy Data Reports?		✓	MBTA + other local state railway Companies
2.11.18	Were State-wide railroad locomotive emissions apportioned to the inventory area by railroad track mileage, freight density, or population?	✓		1989 Mass. State Rail Plan
2.11.19	Was fuel consumption for recreational vehicles based on State-wide boat registration data?	✓		
2.11.20	Were the number of recreational boats (State-wide) apportioned to the inventory area level based on water surface area?	✓		"
2.11.21	Were emission estimates for Marine vessels based on quantity of fuel used as recorded in DOE's Energy Data Reports?		✓	Volume IV
2.11.22	Were statistics from Waterborne Commerce of the US used to apportion marine vessel activity by port location?	✓		
2.12	CONSISTENCY CHECKS - AREA NON-ROAD MOBILE SOURCES			
2.12.1	Are annual emission estimates for agricultural equipment:			
	- between 0.27 and 6.39 lbs VOC/person?		✓	0.19
	- between 5.14 and 122.80 lbs CO/person?		✓	3.61
	- between 0.69 and 15.70 lbs NO_x/person?		✓	0.48
2.12.2	Are annual emission estimates for non-road construction equipment:			
	- between 1.12 and 5.35 lbs VOC/person?		✓	0.76
	- between 17.42 and 83.02 lbs CO/person?		✓	9.87

APPENDIX A - OZONE NONATTAINMENT INVENTORY REVIEW
TABLE A-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.12.2 cont'd	- between 4.85 and 23.23 lbs NO_x/person?		✓	4.18
2.12.3	Are annual emission estimates for industrial machinery:			
	- between 0.30 and 0.81 lbs VOC/person?		✓	0.99
	- between 7.7 and 19.7 lbs CO/person?	✓		17.3
	- between 0.85 and 2.15 lbs NO_x/person?	✓		1.90
2.12.4	Are annual emission estimates for non-road motorcycles:			
	- between 0.12 and 0.51 lbs VOC/person?		✓	0.047
	- between 0.45 and 1.88 lbs CO/person?		✓	0.17
	- between 0 and 0.012 lbs NO_x/person?	✓		0.0010
2.12.5	Are annual emission estimates for lawn and garden equipment:			
	- between 0.005 and 0.051 lbs VOC/person?		✓	0.54
	- between 0.047 and 0.479 lbs CO/person?		✓	5.1
	- between 0.001 and 0.005 lbs NO_x/person?		✓	0.055

APPENDIX B

CHAIN OF CUSTODY FORMS AND QUALITY REVIEW CHECKLIST FOR CARBON MONOXIDE NONATTAINMENT EMISSION INVENTORIES

APPENDIX

APPENDIX B - CO NONATT ENT INVENTORY REVIEW
TABLE B-1. LEVEL I QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
1.1	**INVENTORY OVERVIEW**			
1.1.1	Is the nonattainment area to which the inventory is applicable defined?	✓		
1.1.2	Has the correct nonattainment classification (Moderate or Serious) been indicated for the inventory area?	✓		
1.1.3	Are individual counties represented in the inventory identified?	✓		
1.1.4	Are summary emission totals tables provided for CO emission sources in the inventory area?	✓		
1.1.5	Are summary emission totals provided for CO emission sources on a county-specific basis?	✓		
1.1.6	Is the calendar year basis for the baseline inventory specified?	✓		
1.1.7	Have each of the following source types been addressed in the inventory?			
	- Stationary Point Sources (SPS)	✓		
	- Stationary Area Sources (SAS)	✓		
	- On-Road Mobile Area Sources (OMAS)	✓		
	- Non-Road Mobile Area Source (NMAS)	✓		
1.1.8	Specify the percent contribution of each of the source types listed in 1.1.7 to the total inventory emissions for CO. CO (%) - TPSD ; Co(%) - TPWD -SPS 1.0 ; 0.9 -SAS 2.2 ; 17.0 -OMAS 78.8 ; 72.6 -NMAS 18.0 ; 9.5			
1.1.9	Do the emission estimates for CO reflect seasonal and weekday adjustments?	✓		
1.1.10	Have all existing regulatory requirements for each source category type been identified?	✓		

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-1. LEVEL I QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
1.2	**POINT SOURCES**			
1.2.1	Have all CO point sources in the nonattainment area with emissions equal to or greater than 100 tons/yr been included in the inventory?	✓		
1.2.2	Have detailed process and emissions data been provided for each CO point source with emissions equal to or greater than 100 tons/yr?	✓		
1.3	**AREA SOURCES**			
1.3.1	Have each of the following major categories of non-mobile area source emissions been addressed in the inventory? -Stationary Source Fuel Combustion - Institutional	✓		
	- Residential	✓		
	-Waste Disposal, Treatment and Recovery - Open Burning	✓		
	-Miscellaneous Area Sources - Forest Wildfires	✓		
	- Managed (Slash/Described) Burning	✓		
	- Charcoal Grilling		✓	
	- Structure Fires	✓		
	- Firefighting Training		✓	
	- Aircraft/Rocket Engine Firing and Testing	N/A		
1.3.2	Are all area source emission estimates documented by providing the emission factor and activity level used and the sources of these data?	✓		
1.3.3	Where appropriate, have point sources' contributions been subtracted out from area source category estimates?	✓		

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-1. LEVEL I QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
1.4	MOBILE SOURCES			
1.4.1	Have all of the following on-road vehicle class been addressed in the inventory?			
	- Light Duty Gasoline Vehicles (LDGV)	✓		
	- Light Duty Gasoline Trucks 1 (LDGT1)	✓		
	- Light Duty Gasoline Trucks 2 (LDGT2)	✓		
	- Heavy Duty Gasoline Vehicles (HDGV)	✓		
	- Motorcycles (MC)	✓		
	- Light Duty Diesel Vehicles (LDDV)	✓		
	- Light Duty Diesel Trucks (LDDT)	✓		
	- Heavy Duty Diesel Vehicles (HDDV)	✓		
1.4.2	Has EPA's MOBILE4.1 model been used to estimate on-road vehicle mobile source emission factors? (Exception: California may continue to use the EMFAC mobile model)	✓		
1.4.3	Has information been provided to document how on-road vehicle mobile source emissions estimates were determined using MOBILE4.1?	✓		
1.4.4	Is information provided to document how each of the following MOBILE4.1 inputs was derived?			MOBILE 4.1 Defaults
	- tampering rates	✓		
	- vehicle miles traveled by vehicle type	✓		(MOBILE 4.1 Defaults, MHD info, will be in
	- annual mileage accumulation rates and registration distribution by vehicle type and age	✓		final inventory)
	- inspection and maintenance programs	✓		I/M-1983, 12% stringency, 1% waiver rate
	- anti-tampering programs	✓		MOBILE4.1 Defaults
	- ASTM volatility class	N/A		No longer used in MOBILE 4.1

APPENDIX

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-1. LEVEL I QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
1.4.4. cont'd	- minimum and maximum daily temperature	✓		
	- base Reid Vapor Pressure (RVP)	✓		
	- In-use RVP and in-use start year	✓		
	- altitude region	✓		
	- calendar year	✓		
	- speed	✓		
	- ambient temperature	✓		
	- operating modes	✓		
1.4.5	If a procedure other than the MOBILE4.1 model was used to generate emission factors, was the procedure identified and documented?	N/A		
1.4.6	Are estimates of vehicle miles traveled (VMT) provided that are:			
	- road-type specific?	✓		
	- vehicle-type specific?		✓	Not yet available
1.4.7	Are VMT estimates documented by any of the following methods?			
	- urban transportation planning model inputs and outputs are provided		✓	
	- traffic count program data are provided		✓	
	- Highway Statistics data are provided along with the algorithms used to disaggregate the data to the county level		✓	Highway Statistics not provided
	- the methods used to grow previous year VMT data to the base year are provided	N/A		
	- State/local program data are provided	✓		MHD VMT data by road class & speeds
	- other (specify in Comments)			

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-1. LEVEL I QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
1.4.8	Have all of the following non-road vehicle classes been addressed in the inventory?			
	- farm equipment	✓		
	- construction equipment	✓		
	- industrial machinery	✓		
	- lawn and garden equipment	✓		
	- snowmobiles	✓		
	- aircraft	✓		
	- railroad locomotives	✓		
	- marine vessels	✓		
1.4.9	Was MOBILE4.1 used to estimate emissions for non-road mobile sources?		✓	
1.4.10	If MOBILE4.1 was not used, are the emission calculation procedures documented by providing the following parameters?			
	- the emission factor used	✓		
	- the source of the emission factor	✓		
	- the activity level used	✓		
	- the source of the activity level	✓		
1.5	QUALITY ASSURANCE PROCEDURES	●		
1.5.1	Were quality assurance efforts carried out during the development of the inventory?	✓		
1.5.2	If yes, are these efforts documented in the submitted inventory or an accompanying plan?	✓		

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-1. LEVEL I QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
1.5.3	If a quality assurance program was used (Question 1.5.1 is answered yes), were the following activities performed?			
	- measures taken to ensure that the point and area source lists were complete	✓		
	- alternate emission estimation procedures were considered	✓		
	- the accuracy of the data collected as inputs to the emissions estimation procedures were checked	✓		
	- calculations were reviewed to identify errors	✓		
	- the reasonableness of the resulting emission estimates was evaluated	✓		
	- an independent audit of the inventory was conducted	N/A		
	- other (please specify)			

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.1	**COMPLETENESS CHECKS - POINT SOURCES**			
2.1.1	Are the following CO point source categories included in the inventory?			
	- External fuel combustion	✓		
	- Stationary internal combustion	✓		
	- Waste disposal	✓		
	- Industrial processes	✓		
2.2	**PROCEDURES CHECKS - POINT SOURCES**			
2.2.1	Does the inventory documentation describe the methodology used (i.e., survey, plant inspections, AFS/NEDS, permit files, etc.) to develop the point source inventory listing?	✓		
2.2.2	Does the point source inventory reflect a base year of 1990?	✓		
2.2.3	Were summary emission estimates adjusted to reflect the peak CO season for the inventory area?	✓		
2.2.4	Were summary emission estimates adjusted to reflect rule effectiveness?	✓		
2.2.5	Does the inventory documentation describe the methodology used to define the peak CO season?		✓	Peak Ozone season is not defined.
2.2.6	Does the point source inventory documentation include the contact person(s) for referring questions?	✓		
2.2.7	Select a subset which represents at least 25% of the listed point sources with CO emissions greater than or equal to 100 tons/yr and determine if the following data are compiled and presented for each of these sources (Note: Identify in the comment column the record numbers of these plants that were checked).			7 of 21 plants with CO emissions > 100 TPY were checked These plants had 25 point sources
	- Plant name and location	✓		

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.2.7 cont'd	- AFS (or NEDS) point ID	✓		
	- SIC code	✓		
	- Operating Schedule	✓		
	- Applicable Regulations	✓		
	- Emission Limitations (only if subject to SIP Reg)	✓		
	- Compliance year (only if subject to SIP Reg)	✓		
	- SCC Code for Process Unit	✓		
	- Daily Process Rate and units		✓	(4 of 25 point sources did not have hourly data)
	- Control Equipment	✓		
	- Control Efficiency	✓		
	- Emission Estimation Method	✓		
	- Emission Factor	✓		
	- Annual Nonbanked emissions	✓		
	- Rule Effectiveness	✓		
	- Seasonal Adjustment Factor	✓		
	- CO Season Daily Emissions	✓		
2.3	CONSISTENCY CHECKS - POINT SOURCES			
2.3.1	Are unadjusted annual emission estimates for CO from point source within 25% of the values reported in AFS (or NEDS)?	N/A		
2.4	COMPLETENESS CHECKS - AREA SOURCES			
2.4.1	Does the inventory contain CO area source emission estimates for the following source categories? - Stationary source fuel combustion - Electric utility boilers	✓		

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-2. LEVEL II [illegible]TY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.4.1 cont'd	- Industrial boilers	✓		
	- Commercial/institutional external fuel combustion	✓		
	- Residential fuel combustion	✓		
	- Waste disposal, treatment and recovery - On-site incineration	✓		
	- Open burning	✓		
	- Miscellaneous area sources - Forest wildfires	✓		
	- Managed (slash/described) burning	✓		
	- Charcoal grilling		✓	
	- Structure fires	✓		
	- Firefighting training		✓	
	- Aircraft/rocket engine firing and testing	N/A		
2.5	PROCEDURES CHECKS - AREA SOURCES			
2.5.1	Were area CO emission estimates for the following categories developed using per capita emission factors?			
	- Waste disposal combustion	✓		
	- Open burning	N/A		Not allowed during ozone season
	- Structure fires (Included in Forest/Non-Forest Fires)		✓	# of fires times fuel loading factor
2.5.2	Was point source fuel use subtracted from total area-wide fuel use in determining fuel use for stationary area source fuel combustion categories?	✓		
2.5.3	Were CO emission estimates for forest fires based on information obtained from the U.S. Forest Service, a State forestry department or a local fire protection agency?	✓		Mass. Dept. of Safety, State Fire Marshall's Office ~~&~~ State Division of Forest and Parks, Bureau of Fire Control

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.5.4	Were data from the census of housing used to estimate residential consumption of wood for fuel use?		✓	State Division of Forest and Parks
2.5.5	Was information from the U.S. Forestry Service and/or State forestry department used to estimate total area for managed burning?	✓		
2.6	CONSISTENCY CHECKS - AREA SOURCES [NOT AVAILABLE FOR DRAFT DOCUMENT]			
2.7	COMPLETENESS CHECKS - AREA ON-ROAD MOBILE SOURCES			
2.7.1	Were all MOBILE4.1 input values documented?	✓		
2.7.2	Does the documentation describe the derivation of all non-default MOBILE4.1 input values?	✓		
2.8	PROCEDURES CHECKS - AREA ON-ROAD MOBILE SOURCES			
2.8.1	Were MOBILE4.1 defaults for tampering rates used?	✓		
2.8.2	If alternative tampering rate values were used, did EPA review and approve the survey on which the data were based?	N/A		
2.8.3	Were specific values for VMT by vehicle type and road type developed?		✓	Not available for Draft Inventory
2.8.4	Were MOBILE4.1 default values for annual mileage accumulation rates, and registration distribution by vehicle type and age used?	✓		
2.8.5	Was the January ASTM volatility class used for estimating CO season gasoline RVP?	N/A		
2.8.6	Were the MOBILE4.1 default values used to define percent of VMT by operating mode?	✓		
2.8.7	Does the documentation describe how VMT estimates were developed if the transportation network input to the urban transportation model did not include rural and/or all urban roads in the inventory area?	N/A		

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.9	**CONSISTENCY CHECKS - AREA ON-ROAD MOBILE SOURCES**			
2.9.1	Was the value used for average wintertime temperature between 20 and 55°F?	✓		39°F Min, 50°F - Max, 44°F
2.9.2	Was the average assumed speed between 2.5 and 55 mph?	✓		Speeds 20 - 60
2.9.3	Was the VMT by road type apportionment within the following ranges?			
	- Interstate: Between 13.3 and 27.7 percent of total VMT?	✓		27.0
	- Other Freeway and Expressway: Between 0 and 9.7 percent of total VMT?		✓	12.9
	- Other Principal Arterial: Between 10.5 and 29.2 percent of total VMT?	✓		24.6 "
	- Minor Arterial: Between 11.7 and 24.3 percent of total VMT?	N/A		
	- Major Collector: Between 7.1 and 19.7 percent of total VMT?	~~✓~~	✓	7.0
	- Minor Collector: Between 0.6 and 3.9 percent of total VMT?		✓	14.9
	- Local: Between 2.6 and 45.4 percent of total VMT?	✓		13.6
2.9.4	Is the calculated annual index of VMT/person within the 1505 to 18991 range?	✓		7,700
2.9.5	Is the calculated annual index of VMT/registered vehicle within the 9181 to 12426 range?	✓		12,136 using USEPA data, 8,074 using POLK data
2.9.6	Is the calculated annual index of VMT/gal gasoline sold, within the range of 15.9 to 20.7?	✓		19.0
2.10	**COMPLETENESS CHECKS - AREA NON-ROAD MOBILE SOURCES**			
2.10.1	Does the inventory contain CO emission estimates for the following off-highway sources?			
	- Construction equipment	✓		

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW
TABLE B-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.10.1 cont'd	- Industrial/commercial equipment	✓		
	- Recreational vehicles	✓		Snowmobiles, Off-road motorcycles
	- Farm equipment	✓		
	- Lawn and garden equipment	✓		
	- Aircraft	✓		
	- Marine vessels	✓		
	- Railroads	✓		
2.11	**PROCEDURES CHECKS - AREA NON-ROAD MOBILE SOURCES**			
2.11.1	Was information on the population of farm equipment items within the inventory area collected using data from the Census of Agriculture?	✓		
2.11.2	Was the number of acres cultivated in each inventory area used to apportion agricultural equipment fuel use?	✓		
2.11.3	Were emission calculations performed separately for combines, balers, harvesters, general purpose machines, and tractors?	✓		
2.11.4	Were emission estimates from farm equipment adjusted to reflect CO season activity levels?	✓		90% of equipment used during the 214 day growing Season
2.11.5	Were local employment statistics for SIC 16 used to estimate the number of pieces of heavy construction equipment in the inventory area?	✓		
2.11.6	Were emission calculations performed separately for the following equipment types?			
	- Tracklaying tractors (diesel)	✓		
	- Tracklaying loaders (diesel)	✓		
	- Motor ~~scrapers~~ graders (diesel and gas)	✓		
	- Scrapers (diesel)	✓		

APPENDIX B - CO NONAT MENT INVENTORY REVIEW
TABLE B-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.11.6 cont'd	- Non-Road trucks (diesel)	✓		
	- Wheel tractors (diesel and gas)	✓		
	- Rollers (diesel and gas)	✓		
	- Wheel dozers (diesel)	✓		
	- Miscellaneous construction equipment (diesel and gas)	✓		
2.11.7	Were local employment statistics for SIC codes 10-14, 20-39, and 50-51 used to estimate the number of industrial engines in use in the inventory area?	✓		
2.11.8	Were CO emission calculations performed for the following industrial engine categories?			
	- Heavy duty diesel	✓		
	- Heavy duty gasoline	✓		
	- Light duty gasoline	✓		
2.11.9	Were non-road motorcyle count estimates based on the number of motorcycles registered for on-road use?	✓		
2.11.10	Were CO emission calculations performed for non-road motorcycle use?	✓		
2.11.11	Was the NEDS Fuel Use Report used to estimate the amount of fuel used annually in lawn and garden equipment?	✓		
2.11.12	Was lawn and garden fuel use apportioned by small engine type (2-cycle and 4-cycle)?	✓		
2.11.13	Were CO emissions calculated for each lawn and garden engine type?	✓		
2.11.14	Were emission estimates from lawn and garden equipment adjusted to reflect CO season activity levels?	✓		1.3 factor

APPENDIX B - CO NONATTAINMENT INVENTORY REVIEW

TABLE B-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.11.15	Was aircraft landing and take-off activity determined from FAA Air Traffic Activity or Airport Activity Statistics of Certified Route Air Carriers?	✓		Supplemented with MASP data
2.11.16	Were emission estimates for railroad locomotives based on quantity of fuel used as recorded in DOE's Energy Data Reports?		✓	MBTA and other local & State Railroad companies
2.11.17	Were State-wide railroad locomotive emissions apportioned to the inventory area by railroad track mileage, freight density, or population?	✓		1990 Mass. Rail Plan
2.11.18	Was fuel consumption for recreational vehicles based on State-wide registration data?	✓		
2.11.19	If recreational boats were included in the CO season inventory, were the number of boats (State-wide) apportioned to the inventory area level based on water surface area?	✓		
2.11.20	Were emission estimates for Marine vessels based on quantity of fuel used as recorded in DOE's Energy Data Reports?		✓	Volume IV
2.11.21	Were statistics from Waterborne Commerce of the US used to apportion marine vessel activity by port location?	✓		
2.12	CONSISTENCY CHECKS - AREA NON-ROAD MOBILE SOURCES			
2.12.1	Are annual emission estimates for agricultural equipment between 5.14 and 122.80 lbs CO/person?		✓	3.61
2.12.2	Are annual emission estimates for non-road construction equipment between 17.42 and 83.02 lbs CO/person?		✓	9.87
2.12.3	Are annual emission estimates for industrial machinery between 7.7 and 19.7 lbs CO/person?	✓		17.3
2.12.4	Are annual emission estimates for non-road motorcycles between 0.45 and 1.88 lbs CO/person?		✓	0.17

APPENDIX B - CO NONA MENT INVENTORY REVIEW
TABLE B-2. LEVEL II QUALITY REVIEW CHECKLIST

		YES	NO	COMMENTS
2.12.5	Are annual emission estimates for lawn and garden equipment between 0.047 and 0.479 lbs CO/person?		✓	5.1

APPENDIX C

ON-ROAD MOBILE SOURCES DETAILED REVIEW CHECKLIST

ENDIX C. ON-ROAD MOBILE SOURCES DETAILED REVIEW CHECKLIST

t 1b VMT Estimates and Use of UTPS

NCY ROLES

Which state/local agencies were responsible for the following functions (if applicable)?

a. Traffic counting: Massachusetts Highway Department (MHD)

b. Network modeling: ____________________

c. Regional growth forecast: ____________________

d. Emission factors: ____________________

e. HPMS reporting to FHWA: MHD

f. Forecasting from HPMS data: ____________________

YEAR ESTIMATES

Which of the following methods was chosen to estimate base year (1990) VMT?

✓ Highway Performance Monitoring System (HPMS);

_____ Network-based travel demand model;

_____ HPMS-like alternative;

_____ Traffic across the boundaries of specific problem areas;

_____ Other method.

List SIP page numbers that refer to the method: ____________________

Is the base year (1990) VMT estimate identical to that provided in the annual VMT report required under Section 187 of the Clean Air Act Amendments of 1990? _____ SIP Page # _____ No

ay Performance Monitoring System (HPMS) Method

Are urban areas in the state sampled separately under HPMS? ✓ SIP Page # _____ No

If not, what alternative method was used to estimate VMT?

_____ Proportion of the population aged 16 and older;

_____ Non-HPMS ground counts;

_____ Conversion of area-wide VMT submitted to HPMS into VMT for the specific area being inventoried;

_____ Another reasonable method.

List SIP page numbers that refer to the method: ____________________

____ Another reasonable method.

ist SIP page numbers that refer to the method: ____________________

f urban areas are sampled separately, does the HPMS-based
IP estimate include VMT on all of the following?

. Each volume group within all sampled functional systems within the Federal Aid Urbanized Area (FAUA);

Number of volume groups within functional system listed:

Functional systems:

Interstates ____
Other freeways/expressways ____
Other principal arterials ____
Minor arterials ____
Collectors ____

st SIP page numbers that refer to the volume groups: ____________________

The local functional system within the FAUA; Page # ____ SIP ____ No

If the inventory area is larger than the FAUA, VMT on functional systems outside the FAUA but within the inventory area. Page # ✓ SIP ____ No

C-30

e the methodology and calculations used to estimate VMT on
e local functional system documented in the SIP? Page # ____ SIP ____ No

the inventory area larger than the FAUA? YES Page # ____ SIP ____ No

so, how was VMT on roads outside the FAUA but inside the
ventory area estimated? — HPMS

Applied a state- or county-specific estimate of travel per mile of roadway to the mileage of roads outside the FAUA; Page # ____ SIP ____ No

Travel outside the FAUA is primarily rural. Applied VMT per roadway mile from other purely rural counties to estimate the VMT; Page # ____ SIP ____ No

Another method. Page # ____ SIP ____ No

the actual ground counts for each HPMS sample segment
ted in the SIP, or is a reference given for the data? Page # ____ SIP ____ Ref

t reference: ____________________

Are the dates of those counts and the number of hours over which they were made listed in the SIP, or is a reference given for the data? NK

_____ SIP _____ Ref
Page #

L reference: ______________________________

Is the number of road miles within the Federal Aid Urbanized Area by facility class/volume group listed in the SIP, or is a reference given for the data?

_____ SIP _____ Ref
Page #

List reference: ______________________________ NK

Are the factors used to expand the HPMS segment data into Federal Aid Urbanized Area VMT estimates by facility class/volume group listed in the SIP, or is a reference given for the data? NK

_____ SIP _____ Ref
Page #

List reference: ______________________________

Are the methods and factors used to adjust counts on sample segments for month, day-of-week, and/or hour-of-day documented in the SIP? NK

_____ SIP _____ No
Page #

Are the methods and factors used to adjust counts on sample segments not actually counted in a given year documented in the SIP? NK

_____ SIP _____ No
Page #

sed Model Method

hat are the shortcomings of the HPMS data for 1990 that ead the state to use this approach instead?

____

____

____

____

____

____

____

e demographic inputs to the model updated to 1990?

_____ SIP _____ No
Page #

the model validated against 1990 ground counts?

_____ SIP _____ No
Page #

Are the methods and measures used to validate the model and the results of that validation documented in the SIP, or is a reference given for the information?

NK SIP ____ Ref
Page #

List reference: ____________________

Is the extent to which the traffic assignment matched the base-year ground count for groups of links ranked by average daily traffic volume documented in the SIP, or is a reference given for the information?

NK
____ SIP ____ Ref
Page #

List reference: ____________________

What distinction is made between peak versus off-peak periods?

a. Only two periods (peak and off-peak); Peak Period (hours): ________

Off-Peak Period (hours): ________

. More than two periods; ________

. 24 hours (hour-by-hour). ________

ist SIP page numbers that refer to the data: ____________________

id the model use a constrained equilibrium approach to rip assignment?

____ SIP ____ No
Page #

ere model outputs on zone-to-zone travel times recycled as nputs until a self-consistent equilibrium trip assignment mong zones and modes was achieved?

____ SIP ____ No
Page #

hat procedure was used to ensure that no link was loaded eyond its reasonable capacity?

rocedure: ____________________

ist SIP page numbers that refer to the procedure: ____________________

s the geographic domain to which the model inputs and the MT estimates refer documented in the SIP, or is a reference iven for the information?

____ SIP ____ Ref
Page #

ist reference: ____________________

e the following socio-economic data for the base year (1990) ocumented in the SIP, or is a reference given for the data?

Population, both total and those 16 years and older;

____ SIP ____ Ref
Page #

List reference: ____________________

b. Number of households; _____ SIP _____ Ref
Page #

List reference: ______________________________

c. Employment. _____ SIP _____ Ref
Page #

List reference: ______________________________

. Are a description of the network and a reference to complete documentation of network parameters given in the SIP? _____ SIP _____ No
Page #

List reference: ______________________________

. Are the following model outputs documented in the SIP, or is a reference given for the information?

NK

a. Person-trip lengths in minutes by trip purpose; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

b. Person trips by purpose for internal trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

c. External-internal vehicle trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

d. External-external vehicle trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

e. Transit person-trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

f. Auto person-trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

g. Auto driver person-trips; _____ SIP _____ Value _____ Ref
Page #

st reference: ______________________________

h. Average speed; ____ SIP ____ Value ____ Ref
Page #

List reference: ____________________

i. VMT by functional class; ____ SIP ____ Value ____ Ref
Page #

List reference: ____________________

j. VMT by geographic area; e.g., ring/sector. ____ SIP ____ Value ____ Ref
Page #

List reference: ____________________

. Are the constrained equilibrium speed versus volume-to-capacity equations by functional class documented in the SIP, or is a reference given for the information?

NK

____ SIP ____ Ref
Page #

List reference: ____________________

. Are the specific methodology and calculations used to estimate VMT accumulated on the following functional systems included in the SIP, or is a reference given for the information?

NK

a. The local functional system within the FAUA; ____ SIP ____ Ref
Page #

List reference: ____________________

b. Functional systems within the FAUA but outside of the geographic domain of the network-based travel demand forecasting process; ____ SIP ____ Ref
Page #

List reference: ____________________

c. Functional systems within the inventory area but outside of the FAUA. ____ SIP ____ Ref
Page #

List reference: ____________________

S-Like Alternative Method

viewer should also complete the HPMS section above.)

NK

Is the SIP based on an attainment demonstration for a specifically defined area that encompasses all vehicle travel contributing to the non-attainment problem? ____ SIP ____ No
Page #

NK

30. Is the alternative HPMS-like system documented and justified in the SIP?

____ SIP ____ No
Page #

NK

31. Does the SIP assert that the alternative HPMS-like system conforms to FHWA guidance?

____ SIP ____ No
Page #

NK

32. Does the SIP assert that the alternative system is equivalent to HPMS in terms of providing as reliable and accurate a VMT estimate for the area?

____ SIP ____ No

Page #

33. What other agencies have endorsed the alternative system as being reliable and accurate?

____

____

____

acking Traffic Across the Boundaries of Specific Problem Areas

as the state received prior approval for an attainment demonstration that addresses only locally generated vehicle emissions in a finite number of problem areas?

NK

____ SIP /____ No
Page #

Nature and date of approval: ______________________________

What percentage of the VMT in the area comes from the traffic across the boundaries of each of the specified areas and what percentage is due to intra-area traffic?

NK

____ % Across Boundaries
____ % Intra-Area

Does traffic counting include all approaches to each area?

____ SIP ____ No
Page #

Does traffic counting meet FHWA guidance?

____ SIP ____ No
Page #

Does traffic counting occur during the CO season on those days of the week and times of day when CO exceedances occur?

____ SIP ____ No
Page #

base-year counts taken within the 1987-1992 period and justed for area-wide growth to 1990?

____ SIP ____ No
Page #

. What method was used to estimate areawide VMT in 1990?

List the method: HPMS

List SIP page numbers that refer to the method: p. C- 30.

T FORECASTS

. Which of the following methods was chosen to forecast VMT?

_____ Highway Performance Monitoring System (HPMS);

_____ Network-based travel demand model;

_____ HPMS-like alternative;

_____ Traffic across the boundaries of specific problem areas;

_____ Other method.

List SIP page numbers that refer to the method: p. C30-C31

way Performance Monitoring System (HPMS) Method

Are urban areas in the state sampled separately under HPMS? Yes SIP Page # _____ No

If not, from which alternative method were the area-specific historical estimates derived for purposes of the VMT forecast?

_____ Proportion of the population aged 16 and older;

_____ Non-HPMS ground counts;

_____ Conversion of area-wide VMT submitted to HPMS into VMT for the specific area being inventoried;

_____ Another reasonable method.

List SIP page numbers that refer to the method: p. C-30

Are VMT forecasts based on growth factors derived from an ordinary least squares linear regression extrapolation of the state's 1985-1990 HPMS reports? 1980-1990 _____ SIP Page # ✓ No

Are the methodology and calculations used to forecast VMT on the local functional system documented in the SIP? p. C-30 YES SIP Page # _____ No

Is the inventory area larger than the FAUA? YES _____ SIP Page # _____ No

If so, how was VMT on roads outside the FAUA but inside the inventory area forecasted? p. C-30

a. Applied a state- or county-specific forecast of travel per mile of roadway to the mileage of roads outside the FAUA; NO

____ SIP ____ No
Page #

b. Travel outside the FAUA is primarily rural. Applied VMT per roadway mile from other purely rural counties to forecast the VMT; NO

____ SIP ____ No
Page #

c. Another method. N/A

____ SIP ____ No
Page #

ı6. Was a safety margin applied to any of the VMT forecasts?

____ SIP ✓ No
Page #

If so, does the SIP identify the safety margin used for each forecast?

____ SIP ____ No
Page #

f the HPMS section for base year estimates was completed, questions 47 - 50 may be kipped.

7. Is the number of road miles within the Federal Aid Urbanized Area by facility class/volume group listed in the SIP, or is a reference given for the data? NK

____ SIP ____ Ref
Page #

List reference: ____________________

. Are the factors used to expand the HPMS segment data into Federal Aid Urbanized Area VMT estimates by facility class/volume group listed in the SIP, or is a reference given for the data? NK

____ SIP ____ Ref
Page #

List reference: ____________________

. Are the methods and factors used to adjust counts on sample segments for month, day-of-week, and/or hour-of-day documented in the SIP? NK

____ SIP ____ No
Page #

Are the methods and factors used to adjust counts on sample segments not actually counted in a given year documented in the SIP? NK

____ SIP ____ No
Page #

work-Based Model Method

NK

Is the model validated against 1985 or more recent ground counts?

____ SIP ____ No
Page #

52. Are the years for which VMT was forecast within ten years of either the year in which ground counts were collected to validate the model or within ten years of the year for which a land-use scenario and travel prediction were developed? NK

_____ SIP _____ No
Page #

53. In what year(s) were ground counts collected? NK

List year(s): ______________________________

List SIP page numbers that refer to the information: ______________

54. What are the scenario years for which land-use and travel information were developed? NK

List years: ______________________________

List SIP page numbers that refer to the information: ______________

5. Did the information developed for the scenario years include assumptions for land-use, population, and employment? NK

_____ SIP _____ No
Page #

6. Does the year of the final forecast precede the last scenario year? NK

_____ SIP _____ No
Page #

7. Is VMT growth in each forecast expressed as a ratio of 1990 VMT (rather than as a compound growth rate or an absolute VMT increase)? NK

_____ SIP _____ No
Page #

. Does the VMT forecast for any year include an adjustment for the effect of transportation control measures not already captured by the model? NK

_____ SIP _____ No
Page #

. Was a safety margin applied to any of the VMT forecasts? NK

_____ SIP _____ No
Page #

If so, does the SIP identify the safety margin used for each forecast?

_____ SIP _____ No
Page #

the Network Model section for base year estimates was completed, questions 60 - 70 may skipped.

Are the methods and measures used to validate the model and the results of that validation documented in the SIP, or is a reference given for the information? NK

_____ SIP _____ Ref
Page #

List reference: ______________________________

. What distinction is made between peak versus off-peak periods? NK

a. Only two periods (peak and off-peak); Peak Period (hours): _________

Off-Peak Period (hours): _________

b. More than two periods; _________

c. 24 hours (hour-by-hour). _________

List SIP page numbers that refer to the data: ______________________________

Did the model use a constrained equilibrium approach to trip assignment? NK

_____ SIP _____ No
Page #

Were model outputs on zone-to-zone travel times recycled as inputs until a self-consistent equilibrium trip assignment among zones and modes was achieved? NK

_____ SIP _____ No
Page #

What procedure was used to ensure that no link was loaded beyond its reasonable capacity? NK

Procedure: ______________________________

t SIP page numbers that refer to the procedure: ______________________________

Is the geographic domain to which the model inputs and the VMT estimates refer documented in the SIP, or is a reference given for the information? NK

_____ SIP _____ Ref
Page #

List reference: ______________________________

Are the following socio-economic data for the base year (1990) documented in the SIP, or is a reference given for the data? NK

a. Population, both total and those 16 years and older;

_____ SIP _____ Ref
Page #

List reference: ______________________________

b. Number of households;

_____ SIP _____ Ref
Page #

List reference: ______________________________

Employment.

_____ SIP _____ Ref
Page #

List reference: ______________________________

67. Are a description of the network and a reference to complete documentation of network parameters given in the SIP?

NK

_____ SIP _____ No
Page #

List reference: ______________________________

68. Are the following model outputs documented in the SIP, or is a reference given for the information?

NK

a. Person-trip lengths in minutes by trip purpose; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

b. Person trips by purpose for internal trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

c. External-internal vehicle trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

d. External-external vehicle trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

e. Transit person-trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

f. Auto person-trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

g. Auto driver person-trips; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

h. Average speed; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

i. VMT by functional class; _____ SIP _____ Value _____ Ref
Page #

List reference: ______________________________

j. VMT by geographic area; e.g., ring/sector. _____ SIP _____ Value _____ Ref
Page #

L[illegible] reference: ______________________________

Are the constrained equilibrium speed versus volume-to-capacity equations by functional class documented in the SIP, or is a reference given for the information? _____ SIP _____ Ref
Page #

List reference: ______________________________

Are the specific methodology and calculations used to estimate VMT accumulated on the following functional systems included in the SIP, or is a reference given for the information?

a. The local functional system within the FAUA; _____ SIP _____ Ref
Page #

List reference: ______________________________

b. Functional systems within the FAUA but outside of the geographic domain of the network-based travel demand forecasting process; _____ SIP _____ Ref
Page #

[illegible]ist reference: ______________________________

c. Functional systems within the inventory area but outside of the FAUA. _____ SIP _____ Ref
Page #

List reference: ______________________________

Like Alternative Method

NK

ewer should also complete the HPMS-Like Alternative Method section for base year
ates.)

re VMT forecasts based on growth factors derived from n ordinary least squares linear regression extrapolation of ata collected for the alternative HPMS-like program in the 985-1990 period? _____ SIP _____ No
Page #

f not, what other method was used to forecast VMT?

ther method: ______________________________

ist SIP page numbers that refer to the method: ______________________________

Tracking Traffic Across the Boundaries of Specific Problem Areas

(Reviewer should also complete the Specific Problem Areas section for base year estimates.)

72. If traffic counts were conducted over the 1985-1990 period, are VMT forecasts based on growth factors derived from an ordinary least squares linear regression extrapolation of 1985-1990 traffic estimates across the boundaries of the specified areas? NK

____ SIP ____ No
Page #

73. If traffic counts were not conducted over the 1985-1990 period, from what other reliable indicator of traffic growth were forecasts derived? NK

List the method: ______________________________

List SIP page numbers that refer to the method: ____________________

ELATIONSHIP BETWEEN VMT IN THE TRACKING AREA AND VMT FOR THE NON-ATTAINMENT AREA NVENTORY

4. Does the SIP describe the boundaries of the VMT Tracking Area? NK

____ SIP ____ No
Page #

5. Does the SIP describe the boundaries of the non-attainment area?

____ SIP ____ No
Page #

. How was VMT for the inventory area derived from VMT in the VMT Tracking Area?

Describe the method: ______________________________

____

____

____

____

____

____

____

____

____

List SIP page numbers that refer to the method: ____________________

NK

[illegible]w was VMT for the appropriate inventory season derived from annual VMT (e.g., what [illegible]asonal adjustment factors were used)?

Describe the method: ______________________________

List SIP page numbers that refer to the method: ______________

[illegible] VMT forecasts, how was the forecasted aggregate VMT disaggregated among functional systems to account for the different effects of roadway characteristics on emission factors?
(For example, were functional systems split in the way that they were for the base year estimate, was a network model used to proportion VMT among functional systems, etc.)

Describe the method: ______________________________

[illegible] SIP page numbers that refer to the method: ______________

79. How was VMT disaggregated geographically within the non-attainment area (e.g., network model, road miles, population)?

Describe the method: ______________________________

List SIP page numbers that refer to the method: ______________

APPENDIX C. ON-ROAD MOBILE SOURCE DETAILED REVIEW CHECKLIST

Part 2. Emission Factor Calculations and Use of MOBILE4.1

Input Checks

The following items should be answered by examining the MOBILE4.1 input files, copies of which should be included in the inventory submittal. If copies of the input files are not included, answer each item on the basis of what information (narrative, tables, etc) is supplied. If an item cannot be addressed based on the information provided, place a "?" next to that item.

1.a. Were MOBILE4.1 tampering rates used (TAMFLG=1)? ✓ Yes ___ No

b. If locality-specific tampering rates were used (TAMFLG=2), is documentation provided that the rates used and the tampering survey(s) on which they are based were reviewed and approved by EPA's Field Operations and Support Division? N/A Yes ___ No

.a. What average speeds were assumed for each of the following roadway types?

Interstates	Urban:	58.6 mph	Rural:	59.4 mph
Principal Arterials	Urban:	40.2 mph	Rural:	44.3 mph
Minor Arterials	Urban:	N/A mph	Rural:	N/A mph
Major Collectors	Urban:	33.4 mph	Rural:	35.4 mph
Minor Collectors	Urban:	36.0 mph	Rural:	39.4 mph
Local Roads	Urban:	26.8 mph	Rural:	28.5 mph
Any other roadway types (Specify: Freeway Expres	Urban:	47.5 mph	Rural:	49.8 mph

b. Was the source of the assumed average speeds by roadway type specified? ___ Yes ___ No

Data sources: MHD

es/comments: MHD supplied vehicles speeds by roadway type and county (avg. calculated for purposes of audit)

3.a. Is the same VMT mix used for all roadway types and subareas, or are different VMT mixes used?
✓ Same for all
____ Varies

b. Was the MOBILE4.1 vehicle miles travelled (VMT) mix by vehicle type used (VMFLAG=1)?
✓ Yes ____ No

c. If locality-specific VMT mix(es) by vehicle type were used (VMFLAG=2), are the derivation of these values and the data source(s) provided?
N/A Yes ____ No

Data source(s): ______________________________

Derivation (cite relevant section of submittal) Pgs ____________

4.a. Were MOBILE4.1 annual mileage accumulation rates by age used (MYMRFG = 1 or 3)?
✓ Yes ____ No

b. If locality-specific annual mileage accumulation rates by age were used for one or more vehicle types, are the derivation of the rates and the data source(s) provided?
N/A Yes ____ No

Data source(s): ______________________________

Derivation (cite relevant section of submittal) Pgs ____________

c. Were calendar year 1990 area-specific or State-specific registration distributions by age used (MYMRFG = 3 or 4)? N/A
__ Area-specific
__ State-specific

d. If area- or State-specific registration distributions were used for one or more vehicle types, are the derivation of the rates and data source(s) provided? N/A
____ Yes ____ No

Data source(s): ______________________________

Derivation (cite relevant section of submittal) Pgs ____________

e. If the MOBILE4.1 (national) registration distributions were used, is justification provided for not having developed and used area- or State-specific distributions?
✓ Yes ____ No

es/comments: Mass. Highway Dept. (MHD) will have VMT mix data for the Final Emissions Inventory

5.a. Were MOBILE4.1 basic emission rates used (NEWFLG=1)? ✓ Yes ___ No

b. If any alternate basic emission rate equations were used (NEWFLG=2), is justification provided? N/A Yes ___ No

Data source(s): ______________________________

____

Derivation (cite relevant section of submittal) Pgs ___________

6.a. Is the area being modeled subject to the requirements of an inspection/maintenance (I/M) program in the base year? ✓ Yes ___ No

b. If "yes", did the program cover the entire area being modeled, or only a portion of the area?
✓ Entire area
___ Portion

c. Were the effects of the I/M program on the emission factors calculated by MOBILE4.1 accounted for (IMFLAG=2)? ✓ Yes ___ No

d. If the program applied only to a portion of the area being modeled, were MOBILE4.1 runs both with and without the I/M program used? N/A Yes ___ No

e. If the I/M program applied to only a portion of the area, what areas are and are not covered by the program?

Covered by I/M: ______________________________

____

Not covered by I/M: ______________________________

____

f. How was the VMT split from vehicles registered in each of the I/M domains (covered and not covered) determined? N/A

Data source(s): ______________________________

____

Derivation (cite relevant section of submittal) Pgs ___________

a. Were any "additional" correction factors (for air conditioning use, trailer towing, extra load, and/or NOx humidity correction) used in the MOBILE4.1 runs (ALHFLG = 2 or 3)? ___ Yes ✓ No

b. If so, is justification provided for the use of these correction factors? N/A Yes ___ No

tes/comments: ______________________________

____

8.a. Is the area being modeled subject to the requirements of an anti-tampering program (ATP) in the base year? ____ Yes [✓ No]

b. If so, did the ATP cover the entire area being modeled, or only a portion of the area? N/A ____ Entire area ____ Portion

c. Were the effects of the ATP on the emission factors calculated by MOBILE4.1 accounted for (ATPFLG=2)? N/A ____ Yes ____ No

d. If the program applied only to a portion of the area being modeled, were MOBILE4.1 runs both with and without the ATP used? N/A ____ Yes ____ No

e. If the ATP applied to only a portion of the area, what areas are and are not covered by the program? N/A

Covered by ATP: ________________________________

Not covered by ATP: ________________________________

f. How was the VMT split from vehicles registered in each of the ATP domains (covered and not covered) determined? N/A

Data source(s): ________________________________

Derivation (cite relevant section of submittal) Pgs ____________

a. Were refueling emissions included in the emission factors calculated by MOBILE4.1 (RLFLAG = 1, 2, 3, or 4)? [✓ Yes] ____ No

. If refueling emissions were not included in the emission factors (RLFLAG = 5), does the submittal make clear that these emissions are accounted for in the stationary (area) source portion of the inventory? N/A Yes ____ No

and provide justification for not including these emissions in the mobile source portion of the inventory, as recommended in the guidance? N/A Yes ____ No

Cite relevant section of submittal: Pgs ____________

s/comments: ________________________________

APPENDIX

9.c. Were the refueling emission factors in grams per gallon (g/gal) of dispensed fuel calculated and multiplied by total gasoline sales, as recommended in the guidance, or, were the refueling emission factors calculated in grams per mile (g/mi) and multiplied by the total VMT? NK

___ g/gal * total gasoline sales

___ g/mi * VMT

d. If the g/mi * VMT approach is used, is justification for not using the preferred approach provided? ___ Yes ✓ No

Cite relevant section of submittal: Pgs ___

e. Is the area covered by a Stage II (at-the-pump) VRS control program? ___ Yes ✓ No

f. If so, were the effects of this program on the emission factors accounted for in the MOBILE4.1 runs (RLFLAG = 2 or 4)? N/A Yes ___ No

10.a. Were the emission factors calculated by MOBILE4.1 for an entire day, on an hourly basis, or in both ways?

✓ Day
___ Hourly
___ Both

b. Was the appropriate temperature flag setting used (TEMFLG=1 for daily emission factors, TEMFLG=2 for hourly emission factors)? ___ Yes ___ No

1.a. Were the hydrocarbon (HC) emission factors used calculated as total HC (THC) (NMHFLG=1), non-methane HC (NMHC) (NMHFLG=2), volatile organic compounds (VOC) (NMHFLG=3), total organic gasses (TOG) (NMHFLG=4), or non-methane organic gasses (NMOG) (NMHFLG=5)?

___ THC
___ NMHC
✓ VOC
___ TOG
___ NMOG

b. Is an explanation provided for the choice of HC emission factor composition provided? ✓ Yes ___ No

and is this choice consistent with the composition of the stationary source portion of the emission inventory? ✓ Yes ___ No

Cite relevant section of submittal: Pgs C.24

es/comments: Stage II - Implemented in 1990

APPENDIX

Item 12 to be completed only for areas with I/M programs operating in the base year (Areas for which the answers to items 6.a and 6.c were "Yes")

12.a. Are the I/M program parameters used in the MOBILE4.1 runs provided? ✓ Yes ___ No

b. Compare the parameters provided in the inventory submittal to those provided by EPA I/M staff, and note any discrepancies:

i.	Program start year 1983	✓ OK	___ Not OK
ii.	Stringency level (%) 12	✓ OK	___ Not OK
iii.	First model year (MY) covered 1976	✓ OK	___ Not OK
iv.	Last MY covered 2020	✓ OK	___ Not OK
v.	Pre-1981 MY waiver rate (%) 1%	✓ OK	___ Not OK
vi.	1981+ MY waiver rate (%) 1%	✓ OK	___ Not OK
vii.	Compliance rate (%) 85%	✓ OK	___ Not OK
viii.	Program type (centralized, decentralized computerized, decentralized manual) (computerized decentralized)	✓ OK	___ Not OK
ix.	Frequency of inspections ([✓ annual], biennial)	✓ OK	___ Not OK
x.	Vehicle types covered ([✓ LDGV/LDGT1/LDGT2]/HDGV)	✓ OK	___ Not OK
xi.	Test type Idle	✓ OK	___ Not OK
xii.	Alternate I/M credits used	N/A OK	___ Not OK

If alternate I/M credits were used, are these credits adequately documented and approved for use by EPA I/M staff? N/A Yes ___ No

s/comments: ______________________________

Item 13 to be completed only for areas with anti-tampering programs operating in the base year (Areas for which the answers to items 8.a and 8.c were "Yes")

13.a. Are the ATP parameters used in the MOBILE4.1 runs provided? [redacted] ✓ Yes ____ No

b. Compare the parameters provided in the inventory submittal to those provided by EPA I/M staff, and note any discrepancies:

i. Program start year NK ____ OK ____ Not OK ________________

ii. First model year (MY) covered NK ____ OK ____ Not OK ________________

iii. Last MY covered ____ OK ____ Not OK ________________

iv. Vehicle types covered (LDGV/LDGT1/LDGT2/HDGV) ____ OK ____ Not OK ________________

vi. Program type (centralized, decentralized) ____ OK ____ Not OK ________________

vii. Compliance rate (%) ____ OK ____ Not OK ________________

viii. Inspections performed (Air system, catalyst, fuel inlet restrictor, tailpipe lead deposit test, EGR system, evaporative system, PCV, gas cap) ____ OK ____ Not OK ________________

____

____

tem 14 to be completed only for those areas with Stage II vapor recovery system e[illegible]rements in place in the base year (Areas for which the answers to items 9.d and 9.e e[illegible] "Yes")

4.a. Are the Stage II program parameters used in the MOBILE4.1 runs provided? [redacted] ✓ Yes ____ No

b. Compare the parameters provided in the submittal to those provided by EPA, and note any discrepancies:

i. Program start year NK ____ OK ____ Not OK ________________

ii. Phase-in period (years) ____ OK ____ Not OK ________________

es/comments: ____

____

____

14.b.iii. Efficiency at controlling refueling emissions from LDGVs and LDGTs (%) (N/A) ___ OK ___ Not OK

iv. Efficiency at controlling refueling emissions from HDGVs (%) ___ OK ___ Not OK

Items 15 to 19 deal with the inputs required in the Local Area Parameter Record. Items 15 and 17 only apply for ozone modeling; items 16 and 18 only apply for CO modeling; item 19 applies in both cases.

15. (For ozone/HC modeling)

a. For daily emission factor calculations, are the minimum and maximum temperatures used to model "typical summer day" conditions based on the temperatures recorded on the days having the ten highest ozone concentrations within a 3-month peak ozone season during 1988-90, as provided in the inventory preparation guidance? [✓ Yes] ___ No

b. What are the temperatures used for modeling "typical summer day" emission factors?
Min: 68 °F
Max: 94 °F

c. What are the temperatures used for modeling average annual emission factors? NK
Min: ___ °F
Max: ___ °F

d. Is the derivation of the temperatures used to model average annual emission factors documented? (Not Calculated) ___ Yes ___ No

tems 15.e thru 15.i apply only to areas that modeled hourly emission factors. (N/A)

e. Were the hour-by-hour temperatures used to model "typical summer day" emission factors based on the temperatures recorded on the days having the ten highest ozone concentrations within a 3-month peak ozone season during 1988-90, as provided in the inventory preparation guidance? NK ___ Yes ___ No

Is the derivation of the temperatures used to model "typical summer day" emission factors on an hour-by-hour basis documented? NK ___ Yes ___ No

What are the minimum and maximum temperatures used in the 24-hour period modeled on an hourly basis for modeling "typical summer day" emissions factors, and at what times of day do they occur? NK
Min: ___ °F, at ___ am/pm
Max: ___ °F, at ___ am/pm

Are daily emission factors also calculated, using consistent temperatures, for the determination of diurnal evaporative and refueling HC emissions (which cannot be modeled directly on an hourly basis using MOBILE4.1)? NK ___ Yes ___ No

i. Is the procedure used to disaggregate the daily diurnal evaporative and refueling HC emissions into hourly emissions documented? N/A ___ Yes ___ No

Cite relevant section of submittal: Pgs ______________________

6\.

a. (For CO modeling)
For the emission factor calculations, are the temperatures used to model "typical winter day" conditions based on the temperatures recorded during the ten highest 8-hour CO concentrations within a 3-month peak CO season during 1988-90, as provided in the inventory preparation guidance? ___ Yes ___ No

b. What are the temperatures used for modeling "typical winter day" emission factors?
Min: 39 °F
Max: 50 °F

c. What are the temperatures used for modeling average annual emission factors? Not Calculated.
Min: ______ °F
Max: ______ °F

d. Is the derivation of the temperatures used to model average annual emission factors documented? N/A Yes ___ No

17\.

a. (For ozone/HC modeling)
What is the 1990 ("period 1") RVP used in the MOBILE4.1 runs? 11.5 psi

b. Is the source of this value documented? ___ Yes [✓ No]

MVMA Summer Fuel Survey ___ Yes (Year: ______)
NIPER Summer Fuel Survey ___ Yes (Year: ______)
July volatility limit minus 0.3 psi ___ Yes
Other (Specify: ______________________) ___ Yes

What values were used for "period 2" RVP and "period 2" start year in the MOBILE4.1 runs?
9.0 psi
Start yr: 1989

d. If the in-use start year used in the modeling is earlier than 1989, is any justification for this assumption provided? N/A Yes ___ No

a. (For CO modeling)
What is the 1990 ("period 1") RVP used in the MOBILE4.1 runs? 13.5 psi

). Is the source of this value documented? ___ Yes [✓ No]

MVMA Winter Fuel Survey ___ Yes (Year: ______)
NIPER Winter Fuel Survey ___ Yes (Year: ______)
January volatility limit minus 0.3 psi ___ Yes
Other (Specify: ______________________) ___ Yes

c. Is any winter volatility limit regulation in effect for the base year in the area being modeled?

NK x Yes ___ No

d. If so, what values were used for "period 2" RVP and "period 2" start year in the MOBILE4.1 runs?

13.5 psi

Start yr: 1989

19.a. Are the effects of oxygenated fuels on the emission factors included in the MOBILE4.1 runs (i.e., is the OXYFLG value set to "2" following the "period 2" start year on the local area parameter record?

___ Yes ✓ No

b. If so, are the values provided for oxygenated fuels market shares and oxygen contents reasonable?

___ Yes ___ No

Ether blend market share: ___
Alcohol blend market share: ___
Ether blend avg oxygen content: ___ %
Alcohol blend avg oxygen content: ___ %

c. Is an RVP waiver for alcohol blend fuels in effect in the area being modeled?

___ %

___ Yes ✓ No

tems 20 to 24 deal with the inputs required in the Scenario Record

0. Is the proper region [✓ (1 = low altitude] or 2 = high altitude) entered in the scenario record?

✓ Yes ___ No

• Is the proper calendar year entered in the scenario record?

✓ Yes ___ No

(For ozone/HC modeling)
Are both 1990 and 1991 MOBILE4.1 runs used to interpolate to July 1991 emission factors?

1990 ___ Yes ✓ No

(For CO modeling)
Are 1990 or 1991 MOBILE4.1 emission factors used?

✓ 90 ___ 91

Are MOBILE4.1 runs provided using each of the speeds by roadway type or grouping (see item 2) for which emission factors are required?

✓ Yes ___ No

.For daily emission factors (TEMFLG=1), is an ambient temperature consistent with the minimum and maximum temperatures used (minimum ≤ ambient ≤ maximum)?

✓ Yes ___ No

For hourly emission factors (TEMFLG=2), are MOBILE4.1 runs using each hourly ambient temperature provided?

NK Yes ___ No

24.a. What operating mode fractions are used?

Standard (20.6/27.3/20.6) ✓
Other (____/____/____) ____

b. If the operating mode fractions used are different than the standard values, is documentation provided of the method by which the values used were developed? N/A Yes ____ No

c. Are different operating mode fractions used for the different roadway types?

____ Yes ✓ No

	Urban	Rural
Interstates	____/____/____	____/____/____
Principal Arterials	____/____/____	____/____/____
Minor Arterials	____/____/____	____/____/____
Major Collectors	____/____/____	____/____/____
Minor Collectors	____/____/____	____/____/____
Local Roads	____/____/____	____/____/____

d. If different operating mode fractions were used for the different roadway types, is the derivation of these values documented? N/A Yes ____ No

Cite documentation: ____________________

tems 24.e and 24.f only apply for areas that modeled hourly emission factors

Are different operating mode fractions used for each hour of the day? N/A

____ Yes ____ No

f. If so, is the derivation of these values documented? ____ Yes ____ No

Cite documentation: ____________________

n 25 only applies to areas that used additional correction factors to model the
ssion factors (Areas for which the answer to item 7.a was "Yes")

.Which of the options for application of additional correction factors was used?

ALHFLG=2 ____
ALHFLG=3 ____

25.b.What value was used for "AC" (fraction of air-conditioner-equipped vehicles assumed to actually be using air conditioning)? ______

c. What values were used for "XLOAD" (fractions of LDGVs, LDGT1s, LDGT2s assumed to be carrying an extra 500 lb load)?

LDGV: ______
LDGT1: ______
LDGT2: ______

d. What value(s) were used for "TRAILR" (fractions of LDGVs, LDGT1s, LDGT2s assumed to be towing a trailer)?

LDGV: ______
LDGT1: ______
LDGT2: ______

e. What value was used for "ABSHUM" (absolute humidity in grains H_2O/lb dry air, used to correct NOx emissions for humidity)? ______

f. What dry bulb and wet bulb temperatures were used for determination of air conditioning correction factors?

Dry: ______ °F
Wet: ______ °F

g. Is a rationale provided for the use of these additional correction factors?

___ Yes ___ No

5.a.Were locality-specific diesel sales fractions by model year for LDVs and LDTs used in the MOBILE4.1 runs?

___ Yes [✓ No]

If so, is the source of the information and the derivation of the values provided?

___ Yes ___ No

Cite relevant section of submittal: Pgs ______

a.Were alternate trip length distribution statistics used in the MOBILE4.1 runs for the calculation of running loss HC emission factors?

NK

___ Yes ___ No

If so, is the source of the information and the derivation of the values provided?

___ Yes ___ No

Cite relevant section of submittal: Pgs ______

/Comments: ______

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